Integrated Assessment
Halaco Engineering Company
Oxnard, California
Ventura County

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Executive Summary

The United States Environmental Protection Agency, Region IX, has completed an Integrated Site Assessment of the Halaco Engineering Company, Inc., facility (the Site) under the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA). The purpose of this Integrated Assessment was twofold: (1) provide data for the evaluation of the Site under the Hazard Ranking System (HRS); and (2) evaluate the need for short-term response actions to stabilize the Site. The HRS is the primary method EPA uses for determining whether a site is eligible for placement on the National Priorities List (NPL). The NPL identifies sites to be remediated by EPA under CERCLA.

The Integrated Assessment identifies locations where the concentration of metals or radionuclides exceed background levels, but does not attempt to quantify the risk associated with the elevated concentrations or identify areas needing cleanup. Additional studies are required to fully characterize the Site and assess risk.

The Halaco facility, located at 6200 Perkins Road, Oxnard, California, abuts the Ormond Beach wetlands and is in close proximity to the Ormond Beach Lagoon, Ormond Beach, and the Pacific Ocean. The Ormond Beach wetlands are one of the few large-scale wetlands that remain along California's southern coast. These coastal wetlands are home to several endangered or threatened species, including the western snowy plover and the California least tern.

The Site is an abandoned metal recycling facility bisected by the Oxnard Industrial Drain (OID). Halaco Engineering Company operated in Oxnard from 1965 until 2004. Scrap metal, including radioactive material, was processed at the smelter portion of the facility located on the west side of the OID. Halaco process wastes were disposed of in the OID, on the waste disposal parcel located on the east side of the OID, and later on the smelter parcel.

EPA found contamination sources on the smelter property and the waste disposal parcel. These sources include waste stored within process buildings, a surface impoundment, and a large waste pile. The smelter parcel has an estimated 5,000 cubic yards of process waste. A surface impoundment and waste disposal pile are located on the waste disposal parcel, which together likely contain over 500,000 cubic yards of waste. Contamination found on-site includes a combination of several metals and radionuclides, including aluminum, arsenic, barium, beryllium, cadmium, chromium, copper, lead, magnesium, manganese, nickel, silver, zinc, cesium-137, potassium-40, thorium-228, thorium-230, and thorium-232. Most of these contaminants are found at levels significantly above background. Contaminated soils and sediments containing one or more of the same metals and radionuclides have also been found on adjacent properties, including wetlands and a public beach.

Although a portion of the facility is fenced, there are numerous signs of trespass and vandalism, such as extensive graffiti and off-road vehicle and bicycle tracks. Additionally, this investigation

indicates that nearby populations and receptors could be impacted by contamination from the Site.

While some interim measures have been taken this year to stabilize the Site, this report indicates that additional response actions may be required. Therefore, EPA is considering listing the Site on the NPL to provide long-term remedial action which may be needed to properly address the environmental and human health risks posed by the Site.

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Glossary and Acronyms

Agencies

DFG	State of California, Department of Fish and Game
DHS	State of California, Department of Health Services, referring specifically to the Toxic Substances Control Division, which later became the Department of Toxic Substances Control.
DTSC	State of California, Department of Toxic Substances Control
EPA	United States Environmental Protection Agency
ERS	United States Environmental Protection Agency, Emergency Response Section
LARWQCB	State of California, Los Angeles Regional Water Quality Control Board
NOAA	National Oceanographic and Atmospheric Administration
RHB	State of California, Department of Health Services Radiologic Health Branch
SAS	United States Environmental Protection Agency, Site Assessment Section
USACE	United States Army Corps of Engineers
VCAPCD	State of California, Ventura County Air Pollution Control District

Benchmarks and Regulations

background (bkgd)	Term used to describe the ambient and/or natural concentrations of a contaminant of concern; concentrations are considered to not be associated with site activities.
PRG	Residential Preliminary Remediation Goal (Federal Guidance) - PRGs are "screening level" guidelines used by EPA to evaluate risks from chemical contaminants.
2^{nd} StDev	Second Standard Deviation - the common statistical property describing the range of values that envelop approximately 95% of observations of a set of data.
SQuiRT	Screening Quick Reference Threshold (Federal Guidance)
STLC	Soluble Threshold Limit Concentration (California Regulation)
TCLP	Toxicity Characteristic Leaching Procedure (Federal Regulation)
TTLC	Total Threshold Limit Concentration (California Regulation)

Procedures

CLPAS SOM01.1	Contract Laboratory Program analytical method for volatile organic compounds.
CLPAS ILM05.2	Contract Laboratory Program analytical method for metals.
EPA Method 6010	EPA SW-846 laboratory analytical method for definitive metals analysis (except for mercury).

EPA Method 6200	EPA SW-846 field analytical method for semi-definitive metals analysis by X-Ray Fluorescence.
EPA Method 8260	EPA SW-846 laboratory analytical method for definitive volatile organic compound analysis.
EPA 901.1	EPA method for the analysis of ^{137}Cs and ^{40}K
DOE EML HASL-300 Th-01-RC Modified -	analysis for ^{228}Th, ^{230}Th, and ^{232}Th
ERGS	Enhanced Radiation Ground Surveyor - a tractor-mounted, high-resolution gamma detector operated by the EPA.
Ludlum 2241	Radiological meter with interchangeable probes for measuring a wide range of radiation types.
Ludlum Model 19	Aka: "MicroR" - a radiological instrument that measures gamma radiation in micro Roentgens per minute, and is commonly used for health and safety purposes, but can also be used for gamma surveys.
PID	Photo-Ionization Detector - a field operated, volatile organic compound detector used for air monitoring and sample screening.
XRF	X-Ray Fluorescence Spectrometer used for field screening and analysis of metals by EPA Method 6200.

Site Elements

NCL	Nature Conservancy Lands.
NCL- East	Parcel directly east of the site owned by the Nature Conservancy.
NCL- North	Parcel due north of the WDA owned by the Nature Conservancy.
OID	Oxnard Industrial Drain - water body that bisects the Halaco site.
Ormond Beach	The public beach due south of the Halaco site.
Smelter	Halaco Engineering Company Smelter/recycling Facility; the 11-acre portion of the facility located west of the Oxnard Industrial Drain where the smelting operations and facility offices are located.
WDA	Halaco Engineering Company Waste Disposal Area - the approximately 13-acre area bound by the OID to the west, the WMU to the south, and NCL lands to the north and east.
WMA	Halaco Engineering Company area east of the OID, including the WDA and the WMU.
WMU	Halaco Engineering Company Waste Management Unit - a bermed structure covering approximately 14 acres and 20 to over 25 feet high.

Chemical/Radionuclide Symbols Used:

Ag	Silver
Al	Aluminum
As	Arsenic
Ba	Barium
Be	Beryllium

Cd	Cadmium
Co	Cobalt
Cr	Chromium
Cu	Copper
Fe	Iron
Mg	Magnesium
Mn	Manganese
Ni	Nickel
Pb	Lead
Sb	Antimony
Se	Selenium
Tl	Thallium
V	Vanadium
Zn	Zinc
^{40}K	Potassium-40
^{137}Cs	Cesium-137
^{232}Th	Thorium-232
^{230}Th	Thorium-230
^{228}Th	Thorium-228

Units of Measure

bgs	below ground surface.
mg/kg	milligrams per kilogram
ug/kg	micrograms per kilogram
ug/l	micrograms per liter
pCi/g	picoCuries per gram
pCi/l	picoCuries per liter

Other Concepts:

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CAO	Cleanup and Abatement Order
CDO	Cease and Desist Order
CWA	Clean Water Act
Definitive Data	Data of the appropriate precision and accuracy for final decision making as to be legally defensible. For more information, see the Uniform Federal Policy for Quality Assurance Project Plans.
DQO	Data Quality Objective
ESI	Expanded Site Inspection
HRS	Hazard Ranking System
IA	Integrated Assessment
NOV	Notice of Violation

NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
OSC	EPA Federal On-Scene Coordinator
PA/SI	Preliminary Assessment/Site Inspection
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
Screening Data	Also called "Field Screening Data" are data that can support preliminary or intermediate decisions but should be supported by definitive data (see definition of Definitive Data above).
slag	Metallic residuum from a smelting process containing unrecoverable and/or non-commercial metal oxides.
START	Superfund Technical Assessment and Response Team
VOC	Volatile Organic Compound

1.0 INTRODUCTION

Under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended (CERCLA), Weston Solutions, Inc. (WESTON®) has been tasked by the U.S. Environmental Protection Agency (EPA), Superfund Division, Emergency Response and Site Assessment Sections to conduct a Hazard Ranking System (HRS) Integrated Assessment (IA) of the Halaco Engineering Company (Halaco) Site, located at 6200 Perkins, Oxnard, Ventura County, California. The IA provides data supporting both the HRS Assessment as well as Removal Assessment goals to help determine whether additional removal efforts are appropriate. The HRS assesses the relative threat associated with actual or potential releases of hazardous substances to the environment, and has been adopted by EPA to assist in setting priorities for further site evaluation and eventual remedial action. The HRS is the primary method for determining site eligibility for placement on the National Priorities List (NPL). The NPL identifies sites to be remediated by EPA under CERCLA.

The Halaco Site (the Site) was identified as a potential hazardous waste site and entered into the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) on November 1, 1979. Halaco Engineering Company was assigned EPA Identification Number CAD009688052. A Preliminary Assessment/Site Inspection (PA/SI) was completed for the EPA by Ecology & Environment, Inc. on April 1, 1983. An Expanded Site Inspection (ESI) was completed for the EPA by Ecology & Environment, Inc. on August 7, 1992 (1).

Halaco filed for bankruptcy protection and reorganization under Chapter 11 of the U.S. Bankruptcy Code on July 24, 2002. Halaco ceased operations in late 2004 when it apparently lacked funds to operate in compliance with its air permit. In addition to the air violations, Halaco had outstanding environmental obligations to different state and local agencies and to nonprofit organizations when it stopped operating. The U.S. Bankruptcy Court converted the case to a Chapter 7 (liquidation) bankruptcy on January 10, 2006.

On June 9, 2006, EPA determined that a time-critical removal action was appropriate at the Site to, among other response actions, secure the facility, remove existing containers of hazardous substances, and generally stabilize portions of the Site. On July 19, 2006, EPA entered into an Administrative Settlement Agreement and Order on Consent with the current owners of the Site and a former operator to implement the removal action under EPA oversight. Given the current Site conditions, EPA also decided to evaluate the Site for potential additional response actions.

EPA conducted this IA in June 2006 as a followup to the previous EPA and State investigations of the Site and to determine if the Site is currently eligible for listing on the NPL. After reviewing its earlier PA/SA and ESI reports, EPA decided that an updated investigation of the Site was necessary to more completely evaluate the Site using the EPA HRS criteria. This report summarizes the results of the IA for the Site.

More information about the Superfund program is available on the EPA web site at http://www.epa.gov/superfund. The attached fact sheet describes EPA's site assessment process (Appendix F).

1.1 Apparent Problem

The apparent problems at the Site, which contributed to the EPA's determination that an IA was necessary include:

- A smelter/recycling facility operated on the Site for approximately 40 years (1965 to 2004).
- Much of the process wastes, including slag, process waters, and other solid and liquid wastes generated over the life of the facility, were disposed of at the Site (2).
- A waste pile from site activities covers approximately 14 acres at the Site; additional waste covers approximately 13 acres to the north of the waste pile.
- Slag/waste material appears to have been used as fill to level the Site for expansion and creation of concrete structures and pavings in the 11 acre Smelter Area of the facility; waste materials have also been stored in Supersacs$_{TM}$ and loose piles in various structures in the Smelter Area (Appendix B).
- Historical data indicate that the process wastes contains concentrations of metals that are significantly above background (2, 3).
- Historical data indicate that the process wastes contains concentrations of radioactive materials that are significantly above background (2, 3).
- Historical data indicate that contaminants from the process wastes may have migrated to adjacent soils, wetlands, groundwater, and adjacent surface waters (2, 3).
- The site is currently vacant and poorly secured.

2.0 SITE DESCRIPTION

2.1 Location

The Halaco Site is located at 6200 Perkins Road, Oxnard, Ventura County, California. The geographic coordinates for the Site are 34º 8' 20" North latitude, 119º 10' 55" West longitude (Appendix D). The Halaco facility abuts the Ormond Beach wetlands and is in close proximity to the Ormond Beach Lagoon, Ormond Beach, and the Pacific Ocean. The location of the Site is shown in Figure 2-1.

2.2 Site Description

The Site consists of two separate parcels on either side of the Oxnard Industrial Drain (OID). The Smelter Area is approximately 11 acres and situated on the west side of the OID. It is jointly owned by the Clarence W. Haack Living Trust, John M. Haack, and Robert D. Haack. The Waste Management Area (WMA), which includes the Waste Disposal Area (WDA) and the Waste Management Unit (WMU), is approximately 27 acres and situated on the east side of the OID. It was recently acquired by Alpha and Omega Development, LLC.

The Site encompasses the following areas:

- Smelter Area – 11-acre parcel where smelting/recycling operations commenced, on the west side of the OID. The Smelter Area is paved in the southern portion and unpaved in the northern portion. There are several metal, brick, and concrete buildings in this area, as well as a cinder block fence that encloses three sides of the Site.
- Waste Management Unit (WMU) – an unlined surface impoundment capped with an evaporation or settling pond; the WMU encompasses the 14-acre, bermed area on the east side of the OID.
- Waste Disposal Area (WDA), north of the WMU – area covering approximately 13 acres to the north of the WMU where dried material from the WMU was historically spread.
- Nature Conservancy Land - East (NCL-east) - parcel directly east of the site owned by the Nature Conservancy.
- Nature Conservancy Land - North (NCL-north) - parcel due north of the WDA owned by the Nature Conservancy.
- Oxnard Industrial Drain (OID) – water body that bisects the Site.
- Ormond Beach - the public beach adjacent to the Site.

2.3 Operational and Regulatory History

Halaco operated at 6200 Perkins Road in Oxnard for almost forty years. The federal, state, and local regulatory history of this Site is voluminous. In addition to the EPA and Army Corps of Engineers (USACE) enforcement actions under the Clean Water Act (CWA), the California Department of Toxic Substances Control (DTSC), the Los Angeles Regional Water Quality Control Board (LARWQCB), the California Department of Health Services Radiologic Health

Branch (RHB), the Ventura County Air Pollution Control District (VCAPCD), the Ventura County District Attorney, and the City of Oxnard have initiated administrative, civil, and/or criminal actions against Halaco for alleged regulatory violations. Additionally, nonprofit public interest organizations have sued Halaco. The background information provided below highlights operational changes and regulatory milestones during Halaco's almost 40 years of operation at this Site.

Based on review of federal, state, local files and other sources, Halaco operated at 11920 S. Alameda in Los Angeles, California, between 1950 and 1955. Between 1955 and 1965, Halaco operated at 18601 S. Main Street in Los Angeles, California (4). In 1965, Halaco's operations moved to the 6200 Perkins Street, Oxnard location. The Smelter portion of the Site was allegedly built upon a former open dump for the City of Oxnard. This dump was phased out after the Wagon Wheel Landfill opened in August 1962. It is believed that the dump accepted lumber, sewer sludges and grits, hospital wastes, and general household refuse. Extensive burning was carried out the last year the dump operated. The dump is believed to have received a final cover of beach sand (5).

Halaco recycled aluminum, magnesium and zinc. Starting in 1969, Halaco received a Radioactive Materials License from the California Department of Public Health, Bureau of Radiologic Health (predecessor to the RHB), to recycle magnesium-thorium alloy. The possession limit was reported as 5,000 pounds of alloy, not to exceed 4% thorium. Authorized use included melting of scrap alloy and dilution to 0.05% thorium. The permit expired in August 1974 (6). It has been estimated that Halaco received and processed 500 to 600 pounds of magnesium-thorium scrap per year (7).

The aluminum scrap metal recycled by Halaco came from shredded cans, machine shop shavings, aluminum-copper radiators, and blocks of partially processed scrap aluminum from other countries. This scrap aluminum contained an estimated 1 to 3 percent copper, plus silver, zinc, lead, chromium, titanium, tin, and minute quantities of other impurities. The magnesium scrap metal came from Volkswagen motor parts and aircraft wheels (8).

Feed stock such as scrap metal was fed into vats for melting. These vats also contained fluxes composed of salts that helped to separate impurities from the metals. The fluxes used included potassium chloride, magnesium chloride, and sodium chloride. When the feed stock was molten, the impurities in the feed stock, such as dirt and metal oxides, rose to the top of the vat of molten material. These impurities (slag) were skimmed off the top of the molten metal and washed. Slag that was dense settled to the bottom of these vats and was also removed and washed. The dense slag often consisted of ferrous metals that do not melt at these temperatures. Molten material in the middle (horizontally stratified) portion of the vat was considered metal suitable for sale as recycled material. This metal was decanted and poured into casts and sold as ingots (9).

The two slags (top and bottom layers) were removed by heavy equipment and placed in a large horizontal rotating drum adjacent to the OID. The slag material was sprayed forcefully with

surface water that was pumped from the OID. In theory, the water dissolved away soluble salts used in the flux, leaving the metals behind. Small amounts of metals (mostly aluminum and magnesium) and oxides may also have been washed away and deposited as waste material. The rotating drums had various perturbations and screens in which they broke up the slag material. The water used to spray the slag material exited the drum as a slurry made up of suspended solids, salts, and ferrous and non-ferrous metals (9).

As the slurry exited the rotating drums, it was poured into a shaker in a sump-like depression. Here the slurry drained away from the shaker and was pumped into the settling ponds on the east side of the OID. The solids left over from the shaker were moved upward with a conveyor belt and separated into magnetic and non-magnetic materials, dumped into bins, then trucked back to the adjacent facility for either feedstock (non-ferrous), or disposal (ferrous). The ferrous metals were sold or disposed of, but not recycled on-site (9).

Between approximately 1965 and 1971, Halaco discharged its industrial waste water into the OID under permit with the Oxnard Sanitation District. This practice was discontinued and the WMU was created in approximately 1971, when the LARWQCB began monitoring Halaco's discharge. After 1971, industrial waste from the Smelter was piped across the OID to the WMU. Discharged waste included washer-tumbler water and the water from the furnace stack scrubbers. Solids settled out into the pond and the clarified water was pumped back to the plant for reuse (8). In 1980, the LARWQCB issued Halaco Order No. 80-58 (Waste Discharge Permit) establishing waste discharge requirements and providing findings about the migration of waste and leachate to groundwater and surface water (10).

Historically, after the liquid portion of the waste slurry dried, solids from the WMU were dredged up and deposited on the WMU berms. At some point during its operations, Halaco began depositing waste solids in the WDA area located to the north of the WMU (8).

On October 4, 1979, the California Department of Health Services (DHS)[1], conducted composite sampling of materials from the waste pond area and found them to contain "appreciable" levels of copper (up to 5,740 ppm), zinc (up to 2,630 ppm), lead, (up to 577 ppm), chromium (up to 651 ppm), nickel (up to 314 ppm), barium (up to 8,240 ppm), and arsenic (up to 835 ppm) (5). Split samples analyzed by a Halaco contractor confirmed these results (11).

On October 17, 1985, the DHS issued a Notice of Violation (NOV) to Halaco for failing to have a permit to treat, store, or dispose of hazardous waste on site, and for disposing of hazardous waste at a non-permitted facility. The DHS ordered Halaco to cease unlawful disposal and correct the violations by submitting a plan for the removal of wastes and restoration of the wetlands (12, 13).

[1]The State hazardous waste regulatory and cleanup programs are no longer part of DHS. These programs were moved to a new agency and department - California Environmental Protection Agency (Cal-EPA)- Department of Toxic Substances Control (DTSC) - in the late 1980s.

On March 17, 1986, the DHS issued a NOV to Halaco for disposal of hazardous waste without a permit. Copper and zinc were found to be above California Title 22 threshold values, and ammonia and cyanide were found to be above background (14).

On April 29, 1994, the DTSC and Halaco entered into a settlement agreement. The DTSC agreed to relax Total Threshold Limit Concentration (TTLC) criteria for copper from 2,500 to 25,000 milligrams per kilogram (mg/kg) and zinc from 5,000 to 50,000 mg/kg for the Halaco Site due to the high alkalinity of the soils, insoluble nature and chemical stability of the solid phase of the waste material. In this settlement, the DTSC agreed that the waste on site was not hazardous with respect to copper and zinc (15).

In 1980, EPA determined Halaco was also subject to a National Pollutant Discharge Elimination System (NPDES) permit (10). At some time after 1980, the City of Oxnard issued an Industrial Waste Discharge Permit, which was terminated in 2003 (16).

In June 2000, the LARWQCB estimated that 430,000 cubic yards of waste material were present in the WMU covering approximately 14 acres at thicknesses varying between 20 and 40 feet. Pursuant to a November 2000 federal wetlands delineation prepared for the City of Oxnard, it was determined that a substantial area of wetlands existed immediately east of Halaco's surface impoundment (17).

A nonprofit public interest organization, the Environmental Defense Center, on behalf of the Santa Barbara Channel Keeper, sued Halaco in state and federal court in January 2001. These lawsuits resulted in a settlement agreement with Halaco in 2003 under which Halaco was required, among other things, to cease discharging contaminated wastewater to its ponds, stop adding solid waste to the WMU, and remove a portion of the waste pile over a 3-year period, or pay up to $500,000 into a local environmental enhancement fund. Additionally, the agreement required Halaco to submit to random air sampling (18).

In March 2002, the LARWQCB issued Halaco a Cease and Desist Order (CDO), ordering it to cease discharging into the WMU and to characterize site wastes to determine whether the solid waste was inert. Based on Halaco’s report, the LARWQCB determined that the solid waste was not inert due to elevated levels of ammonia that could be released to ground and surface waters. In September 2002, Halaco ceased discharging into the WMU in response to the March 2002 CDO and began operating a filter press to process waste material. In July 2003, the LARWQCB issued Halaco a NOV for failure to properly store and contain piles of filter cake at the Smelter side of the Site. In October 2003, the LARWQCB issued Halaco a Cleanup and Abatement Order (CAO) to remove the filter cake (process waste solids). In the 2003 CAO, the LARWQCB concluded that Halaco’s past waste disposal practices and the existing state of the WMU created conditions of pollution that violated an earlier LARWQCB Order and continued to threaten pollution to Ormond Beach, the Ormond Beach Wetlands, the OID, the Oxnard Plain Groundwater, and the waters of the State of California (19).

In October 2002, the Ventura County District Attorney and DTSC filed a joint complaint against Halaco in state court for illegally disposing of used oil by burning it in its smelter or pouring it over scrap metal and dross, which was washed in large rotary washers and then allegedly discharged into the settling ponds that leaked into the ocean. These claims were settled in an April 2004 agreement under which Halaco agreed to pay approximately $150,000 in civil penalties and reimbursement costs to DTSC, the Ventura County District Attorney's Office, and the City of Oxnard's Fire Department (20).

In November 2003, the RHB issued Halaco an Order to Characterize Radioactive Materials at the Site believing that residual levels of thorium and cesium are contained in the materials in the WMU, along the OID, and in the water transport system at the Site. As of March 2004, the RHB notified Halaco that it had neither fully nor satisfactorily complied with the RHB's 2003 Order (21).

The Ventura County Air Pollution Control District (VCAPCD) currently maintains records of complaints and NOVs for a period of ten years. For the period running from January 1995 to November 2004 there have been 187 complaints logged regarding Halaco and 7 NOVs issued by VCAPCD against Halaco (22, 23).

In the Fall of 2003, a jury found Halaco guilty of three misdemeanor counts for unlawful air emissions brought by the Ventura County District Attorney. Halaco was sentenced to three months probation and fined $7,500. Under the terms of probation, Halaco had to install monitoring equipment and send its air data to the VCAPCD for a year. If Halaco exceeded the emission limits established in its air permit, it was required to stop operating immediately. Random air sampling conducted in April and September 2004 revealed that Halaco had exceeded the air permit emission limits and thereby violated the terms of its probation. Halaco, already in a Chapter 11 bankruptcy, presumably did not have the funds to return to compliance and reopen, so the facility permanently shut down in late 2004 (24).

When operations stopped, Halaco had outstanding environmental obligations to most of the aforementioned state, local, and nonprofit agencies, and the established money judgments were subject to the Bankruptcy Court's approval, given the pending Chapter 11 bankruptcy initiated in July 2002. The Bankruptcy Court converted the case to a Chapter 7 (Liquidation) bankruptcy on January 10, 2006.

On February 21, 2006, the LARWQCB sent EPA a written request for a federal removal action at this Site. After conducting removal evaluations in March and April of 2006, EPA determined that a time-critical Removal Action was necessary given the unsecured nature of the Site, evidence of rampant trespass and vandalism, and the existence of uncontrolled hazardous substances on the Site. In July 2006, EPA entered into an Administrative Settlement Agreement and Order on Consent with the owners of the smelter property to implement this Removal Action by improving site security, removing drums and other containers of hazardous substances, and stabilizing on-site hazardous substances.

3.0 INVESTIGATIVE EFFORT

WESTON® prepared a Sampling and Analysis Plan (SAP) (Appendix G) to establish whether hazardous substances have migrated off-site to air, surface waters, surface sediments, groundwater, and surface soils around the Site. In addition, samples were collected to characterize the Waste Management Unit (see Appendix J). Both screening and definitive data, as defined in the *Intergovernmental Data Quality Task Force: Uniform Federal Policy for Quality Assurance Project Plans, EPA 505-B-04-900-B,* were generated during this effort.

3.1 Field Work

On June 19, 2006, WESTON® mobilized to the Site in order to execute the SAP. The scope of work for the field work included:

- Collect up to 380 soil, sediment, and slag/waste samples from surface and subsurface locations to be field screened for metals and gamma radiation.
- Submit up to 118 soil, sediment, and slag/waste samples to a fixed laboratory for metals and radionuclide analyses, as well as a limited number of subsurface samples for volatile organic compound (VOC) analysis.
- Collect up to 50 air samples to be screened for metals and alpha radiation; submit 10 samples to a laboratory for metals analysis (this number was later changed to 35; see changes to SAP below).
- Collect 10 surface water samples to be analyzed for metals, VOCs and radionuclides.
- Collect 14 groundwater samples to be analyzed for metals, VOCs and radionuclides.

In addition, the following changes to the scope of work were made after the SAP was approved:

- Air samples were not submitted for radionuclide analysis because alpha screening did not indicate the presence of radionuclides above background.
- The air samples were analyzed for metals in a laboratory because the X-ray Fluorescence (XRF) detection limits are too high; 35 samples were collected and analyzed for metals.
- Eight fish samples were collected from the OID and the downgradient lagoon; these fish were analyzed for metals and radionuclides.
- The number of air samples collected was changed because four of the six high-volume air pumps were stolen on the night of June 22, 2006.
- Dedicated equipment was used to collect samples from this Site, so no equipment blanks were considered necessary.
- Unfiltered water samples were collected and analyzed.

In order to collect subsurface soil samples and groundwater samples where there were no existing wells, WESTON® advanced soil borings using a GeoProbe® direct-push device at 40 locations, and installed groundwater monitoring wells at nine of these locations. Each of these locations was cleared through Dig-Alert, as well as by a certified geophysical subcontractor, before drilling commenced. Weston installed 1.25-inch wells in nine of the boring locations, as described in Section 3.1.2 below.

3.1.1 Solid Matrix Samples

3.1.1.1 Surface Soil and Waste Samples

WESTON® collected surface soil and slag/waste samples from areas at and adjacent to the Site. Site soil sample locations were based on visual criteria (e.g. staining, discoloration, and proximity to waste handling/storage areas), as well as the results of radiation screening conducted by the EPA. WESTON® collected off-site soil samples from locations most likely to be affected by the Site, using screening data and visual criteria for judgmental sampling. WESTON® also collected samples in areas where visual or monitoring methods did not indicate the presence of contaminants; WESTON® chose sample locations at regular intervals along these areas. In addition, sampling was conducted at regular intervals along the 200-foot strip of NCL-east located east of the WMU. Locations for surface soil sampling included the northern portion of the Smelter Area, waste samples from the WDA, agricultural soils from the fields located north and east of the Site, and residential soils located on public right-of-ways adjacent to homes on Hueneme Blvd. Sample locations for the solid-matrix samples are presented in Figures 3-1 and 3-2.

Surface soil samples were collected from the first six inches of soil with a dedicated plastic scoop and/or a gloved hand. In the cases where the soil was covered by significant vegetation, the sod layer was removed with a shovel, then the area was scraped with a dedicated scoop before the sample was collected. In the cases where the soil surface was too hard to break with a plastic scoop, a shovel was used to break through the hard pan, then a plastic scoop was used to clean the surface and collect the sample.

WESTON® chose a background area to the west of the Site. This area is within one quarter mile of the Site and upwind of the predominant wind direction. Six background samples were collected within a 100-by-100 meter area. Samples were collected in locations that did not appear to be subject to periodic flooding, so as not to be confused with wetland sediments.

Surface soil samples were screened for metals using XRF and for gamma radiation using a Ludlum 2241 with a gamma probe. In addition, data from the EPA's Enhanced Radiation Ground Surveyor (ERGS) were used to identify locations for collecting soil samples. A subset of the surface soil and waste samples was submitted to a fixed laboratory for metals and a radionuclide suite that included ^{137}Cs, ^{40}K, ^{228}Th, ^{230}Th, and ^{232}Th. The decision criteria to determine which samples were sent was predominantly based on screening results, as well as physical observations, and the representation of soils in each area. In addition, all background samples were submitted to a fixed laboratory for definitive analysis.

3.1.1.2 Subsurface Soil Samples

WESTON® completed 35 borings into the WMU waste pile, 12 borings in the Smelter Area, and one boring in the WDA. The purpose was to determine the vertical distribution of waste and degree of heterogeneity in the WMU, and to determine whether contaminants from the Site had

migrated to subsurface soils. WESTON® advanced soil borings using a GeoProbe direct-push device with a two-inch diameter. Samples were collected in dedicated acetate sleeves that were pushed through the sampling interval to produce a 1.25-inch soil core. WESTON® logged the soils in these cores and recorded this information in the logbook.

Boring locations were determined based on the following criteria. Borings in the Smelter Area were conducted at locations prescribed in the SAP in order to either identify contaminants migrating to subsurface soils or install a monitoring well. Borings in the WMU were located by a random distribution where the pile was divided into five areas (based on the historical growth of the waste pile). WESTON® advanced seven borings at randomly selected locations within each area. WESTON® collected soil samples from 5, 10, 15, and 20-foot depths. WESTON® selected two borings in the WMU for the installation of monitoring wells.

Upon opening the core at the prescribed sample interval, a small portion of the sample was placed in a plastic bag for headspace monitoring with a photo-ionization detector (PID). If organic vapors were detected above background, then a VOC sample was collected first, using three EnCore$_{TM}$ VOC sampling devices . Once the VOC sample was collected, WESTON® placed the remaining sample in a resealable plastic bag for XRF and radionuclide screening. VOCs were only detected by PID in a small number of samples from the WMU. The remaining VOC samples were collected from the last cores in the series if no VOCs were otherwise detected.

A prescribed subset of the subsurface soil samples was sent to a laboratory based on the following criteria. A single sample from each of the WMU borings was randomly selected from one of the four samples collected. Of these, seven samples from each area were submitted to a laboratory for total metals, Toxicity Characteristic Leaching Procedure (TCLP), Soluble Threshold Limit Concentration (STLC), and radionuclide analyses. In addition, two samples were submitted for VOC analysis from each area. Subsurface samples from the remaining borings were chosen based on the highest concentrations of metals observed in the screening data.

A total of 171 subsurface soil and slag/waste samples were collected and screened for metals, gamma radiation, and VOCs. A total of 40 subsurface soil and waste samples were submitted to a laboratory for metals and radionuclide analysis; a total of 14 subsurface soil and waste samples were submitted to a laboratory for VOC analysis.

3.1.1.3 Sediment Samples

WESTON® collected sediment samples from wetlands, surface water, beach, and marine environments; sample locations are presented in Figures 3-1 and 3-2. WESTON® also collected a representative background group for each of these sediment types. Wetlands and beach sediment samples were collected in the same manner as the surface soil samples, using a dedicated trowel. The surface water sediments were collected using an Eckman-type dredge; the sediments were extracted from the dredge using a gloved hand. The marine sediments were collected into a dedicated Vibrocore$_{TM}$ sleeve.

The sediment samples were screened for metals by XRF, and for gamma radiation. Because of the time constraints on the XRF, some of the OID samples could not be dried and processed toward the end of the field work; however, all OID samples were submitted to a laboratory for definitive analysis. All of the background samples from each sediment type were submitted to a laboratory for definitive analysis for metals and radionuclides, as well as a subset of samples from each sediment type from areas most likely affected by the Site.

3.1.2 Groundwater Samples

WESTON® collected groundwater samples from fourteen wells on and around the Site; well locations are presented in Figure 3-3. Five of the wells were pre-existing, two-inch wells installed by Padre and Associates in, or around 2002. WESTON® installed nine new, 1.25-inch wells around the Site. WESTON® installed the nine wells using a GeoProbe direct push tool between June 19 and June 22, 2006. With the exception of the two wells installed on the WMU, all of the wells were developed using a surge mass, then a minimum of five well volumes of water was extracted. The two wells installed on the WMU were surged, but both wells silted up and ran dry during the attempts to purge these wells. The wells were allowed to recover, then water samples were collected.

WESTON® collected water samples from each of the two-inch wells using dedicated bailers. WESTON® collected water samples from the new wells with a peristaltic pump using dedicated tubing. Unfiltered samples were collected.

3.1.3 Surface Water Samples

WESTON® collected surface water samples from six locations adjacent to the WMU and four locations upgradient of the Site. Two of the adjacent surface water samples were collected from the water body directly south of the WMU; the remaining surface water samples were collected from the OID. Surface water sample locations are shown in Figure 3-4.

WESTON® collected surface water samples by immersing one glass and one poly bottle beneath the surface and opening the cap. Once the bottle was filled, the cap was resealed under water. The VOC samples were collected by transferring water from the glass bottle to pre-preserved VOA vials immediately after sampling. The water sample bottles were placed on ice as soon as they were collected.

3.1.4 Air Samples

WESTON® and the Superfund Technical Assessment and Response Team (START) contractor installed high-volume air samplers at five locations around and downwind (according to predominant wind directions) of the Site. Station AIR1 was located off the southwest corner of the WMU, between MW-1 and the OID. Station AIR2 was located off the northeast corner of the WMU along with a meterological station. Station AIR3 was located about two-thirds of the way north along the eastern side of the WMU on the NCL. Station AIR4 was located on a high

point north of McWane Road, just beyond the City of Oxnard Barricades. Station AIR5 was located due north of the eastern side of the WMU approximately 0.25 miles from the WMU. An additional air sampler (Station AIR6) was used to provide a co-located station near AIR2. The locations are presented in Figure 3-5.

On the night of June 22, three generators, the meteorological station and four of the high-volume air pumps were stolen. WESTON® continued to collect data for stations AIR1 and AIR2 until three new pumps arrived on June 27. Meteorological data were obtained from the Oxnard Airport National Oceanographic and Atmospheric Administration (NOAA) office data.

3.1.5 Fish Tissue Samples

The EPA tasked WESTON® to collect fish tissue samples. The SOP used to collect the fish is presented in Appendix G. WESTON® collected nine fish tissue samples from various locations within the OID and in the adjacent lagoon using nets and fish traps.

There are nine samples, each representing species, size, and areas within the lagoon where the fish were caught. Individual fish were bulked in order to meet the minimum/ideal weight requirements for the metals and gross alpha/gamma analyses. Each sample was divided into two subequal aliquots, one for metals, and one for gross alpha/gamma. Sample number eight was inadvertently skipped. The locations, species, and sizes (where applicable) for each sample are:

- FISH1- eight topsmelt, greater than 4" in length, collected from the mouth of the OID.
- FISH2 - approximately 40 topsmelt (1 - 4") collected from the mouth of the OID.
- FISH3 - six long-jawed mudsuckers from the mouth of the OID.
- FISH4 - five large topsmelt collected from the outer industrial drain (beyond OID mouth).
- FISH5 - fifteen staghorn sculpin collected from the outer industrial drain (beyond OID mouth).
- FISH6 - approximately 690 grams of small topsmelt collected 50 meters downstream of the bridge in OID.
- FISH7 - 16 Topsmelt from the Fish Kill location at the extreme south end of the lagoon.
- FISH9 - 3 killifish collected from outer industrial drain (beyond OID mouth).
- FISH10 - 3 Long-jawed mudsuckers collected near the bridge in the OID.

3.2 Analytical Results

WESTON® collected solid, water, air, and fish tissue samples at the Site for field screening and analyses for metals, radionuclides, and VOCs in accordance with the SAP, and as described above in Section 3.1. Total metals, radionuclide, and VOC results for solid and water samples, as well as metals in fish and air samples, are described below. STLC and TCLP analysis on waste materials are described in the Halaco IA Technical Addendum, which is located in Appendix J.

3.2.1 Solid Matrix Samples

3.2.1.1 Screening Metals by XRF

WESTON® collected 350 solid matrix (soil, sediment, and solid waste) samples from the Halaco Site. Of these, WESTON® analyzed 337 for metals by EPA Method 6200 (metals by XRF). Due to time constraints and difficulties with sample coordination, thirteen samples were not analyzed by XRF. Of these, six were analyzed in a laboratory for metals. Data were not generated for the remaining seven samples.

Solid matrix samples were prepared in the manner described in EPA Method 6200. The samples were dried and sieved to remove gravel components, then placed in an XRF cup. The samples were analyzed using an EPA-owned Niton XLP 233 XRF unit. Samples were analyzed under controlled conditions in a former office within the Halaco facility. Large metal objects, electronic equipment, debris, and a large amount of dust were removed from the office before samples were prepared and analyzed.

The results of the XRF analysis are presented in Appendix H of this report. Data are reported for antimony (Sb), arsenic (As), barium (Ba), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), iron (Fe), manganese (Mn), molybdenum (Mo), nickel (Ni), lead (Pb), selenium (Se), silver (Ag), and zinc (Zn). Of the target metals, aluminum (Al), magnesium (Mg), and beryllium (Be) could not be analyzed by XRF due to their low mass. A summary of the XRF data, broken out by matrix and area, is presented in Table 3-1. The XRF data were used primarily in the determination of which samples to submit for definitive analysis.

3.2.1.2 Radioactivity Screening

WESTON® screened each sample for gamma radiation using a Ludlum 2241 with a 3 x 3" sodium iodide gamma probe. In addition, a pancake probe was used to screen for alpha and beta radiation at areas with above-background gamma readings and for health and safety purposes. A Ludlum Model 19 “Micro R” meter was also used for health and safety purposes. Readings were recorded in the logbooks and were used in the field to aid in the determination of which samples would be sent to the laboratory for definitive analysis.

EPA’s Office of Radiation and Indoor Air assisted the investigation by providing a large, tractor-mounted gamma detector, the ERGS, for screening large areas. The detector consists of a 12 x

12" sodium iodide gamma probe encased on five sides by lead shielding. The detector is tied into a global positioning system that allows for mapping the gamma results. The detector was suspended approximately 12 to 18 inches from the ground surface as the tractor traversed the target areas. The data were plotted on site maps and were used to identify areas of concern for sampling.

The tractor-mounted gamma detector was used to screen unimproved areas in the Smelter Area, the WDA, the surface of the WMU, the NCL-east, and along Ormond Beach. Great care was used to ensure that the tractor did not disturb local wildlife (nesting sites were mapped out by a Department of Fish and Game (DFG) contractor, and a safety perimeter was enforced), and the ERGS was not used in the wetlands at all. The resulting data maps are presented in Appendix I.

The ERGS results showed significant (greater than two standard deviations above the median background range) gamma anomalies in the Smelter Area, WDA, NCL-east, and the Ormond Beach areas; these areas were targeted for further inspection and sampling during the course of the field work. No significant anomalies were identified in the WMU.

3.2.1.3 Definitive Metals Results

Of the 397 samples collected at the Site, WESTON® submitted 117 solid-matrix samples for definitive analysis for metals by EPA Method 6010B. The laboratory results for solid matrix samples are presented in Table 3-2 and are broken out by matrix (soil, sediment, solid waste), area, and background designation. Laboratory data packages are included in Appendix H. In addition, ERS Removal considerations and associated statistical rendering of analytical data are presented in Appendix J.

The definitive metals results for soils include samples collected from the Smelter Area (six samples), the NCL-east (eight samples) located directly east of the WMA, agricultural soils (two samples), residential soils (two samples), and a background area (six samples) located west of the Site. All soil samples are compared directly with the background suite; the high and average values for each analyte are presented in Table 3-2. Soil sample results that are significantly elevated with respect background are presented in boldface for each analyte; "significantly elevated" is defined as exceeding three times the highest background value for each analyte. All soil samples from the Smelter Area, and seven of the eight samples from the NCL-east area exceeded three-times background for one or more metals. None of the results from the residential and agricultural samples exceeded three-times background. Sample locations are plotted on Figures 3-1 and 3-2.

Metals results from the soils are compared to residential Preliminary Remediation Goals (PRG) values. PRGs are "screening level" guidelines used by EPA to evaluate risks from chemical contaminants. PRGs are available for various media (soil, water, air) and for different exposure scenarios (e.g. soil in a residential area, soil in an industrial area, water used as drinking water supply). In this study, metals results in soils are compared to Residential PRGs, which are several times lower than Industrial PRGs. In most, but not all cases, no further action or study is

warranted if contaminant concentrations are less than PRGs. If contaminant concentration exceeds a PRG, further evaluation is usually appropriate. Exceeding a PRG does not necessarily imply that risks are at unacceptable levels and that cleanup is needed.

None of the background soil samples exceeds the PRG values; in addition, none of the metals results for the residential or agricultural soils exceed these action levels. Of the soils collected in the NCL-east, six of the eight samples exceed the PRG for at least one of the following metals: Al, Ba, Cr, Cu, Mg, Mn, Pb, and Zn.

All six of the surface and subsurface soil samples collected in the Smelter Area exceed both the three-times background threshold and the PRG for at least one of the following metals: Al, Ba, Cr, Cu, Mg, Mn, Pb, and Zn.

The definitive metals results for six downgradient marine sediment samples are presented in Table 3-2, along with an additional six background marine sediment samples. Sample results are compared to a value three times the highest background samples, as well as NOAA Screening Quick Reference Table (SQuiRT) values. No marine sediment metals results exceeded three-times background or exceeded any SQuiRT value.

The definitive metals results for six downgradient beach sediment samples are presented in Table 3-2, along with an additional six background beach sediment samples. Sample results are compared to a value of three-times the highest background samples, as well as NOAA SQuiRT values. Five of the six beach sediment samples exceed three-times background for barium; and one sample exceeds three-times background for chromium. None of the beach sediment samples exceed the SQuiRT values.

The definitive metals results for ten downgradient surface water sediment samples from the OID are presented in Table 3-2, along with an additional six background OID sediment samples. Sample results are compared to a value of three-times the highest background sample, as well as NOAA SQuiRT values. Five of the ten OID sediment samples have metals results that exceed three-times background for at least one of the following analytes: Al, Ba, Be, Cd, Cr, Cu, Pb, Mg, Ni, and Zn. Three of the four background OID sediment samples exceed the NOAA SQuiRT values for Cd and Zn; eight of the ten downgradient OID sediment samples exceed the NOAA SQuiRT values for at least one of the following analytes: Al, As, Cd, Cr, Co, Cu, Pb, Mn, and Zn.

The definitive metals results for six wetland sediment samples from the OID are presented in Table 3-2, along with an additional six background wetland sediment samples. Sample results are compared to a value of three-times the highest background sample, as well as NOAA SQuiRT values. All six downgradient wetland sediment samples have metals results that exceed three-times background for at least one of the following analytes: Al, Be, Cd, Cr, Cu, Co, Pb, Mg, Mn, V, and Zn. All wetlands samples exceed the NOAA SQuiRT values for at least one of the following analytes: Al, As, Cd, Cr, Co, Cu, Pb, Mn, and Zn.

The definitive metals results for waste samples collected from the Smelter area (two samples), WDA (four samples), and WMU (35 samples) are presented in Table 3-2. Sample results are compared to both three-times the value of the highest background soil sample and PRGs. All of the WDA and Smelter Area samples, as well as 33 of the 35 WMU samples, have metals results that exceed three-times background for at least one of the following analytes: Al, Sb, As, Ba, Be, Cd, Cr, Cu, Co, Pb, Mg, Mn, Ni, Ag, Thallium (Tl), and Zn. All of the waste samples collected from the WDA, one of the two waste samples collected from the Smelter Area, and all but two of the WMU waste samples exceed the PRGs.

3.2.1.4 Radionuclides

Of the 397 solid-matrix samples collected at the Site, WESTON® submitted 130 samples for definitive analyses for radionuclides. The analytical methods used to analyze the target suite of radionuclides include EML HASL 300 for ^{137}Cs and ^{40}K, and DOE EML HASL-300, Th-01-RC Modified for ^{228}Th, ^{230}Th, and ^{232}Th. Radionuclides are reported in picoCuries per gram (pCi/g). The laboratory results for solid matrix samples are presented in Table 3-3 and are broken out by matrix (soil, sediment, solid waste), area, and background designation. Laboratory data packages are included in Appendix G.

The results are compared to the second standard deviation (2nd StDev) from the mean of the background samples for each matrix, as prescribed in the HRS. The 2nd StDev is the common statistical property describing the range of values that envelop approximately 95% of observations of a set of data. The resulting value, calculated for each analyte and sample matrix, was used as the basis of comparison to determine whether radionuclide results in target solids are significantly above background levels. These values are calculated via the method presented in Appendix J and presented in Table 3-3 beneath the background samples for each matrix.

The definitive results for the marine sediment samples indicate no significant difference in concentrations of radionuclides between downgradient and background samples. The exception is that the ^{228}Th value for SDM16 is significantly above background; this value is lower than the highest background concentration for this radionuclide.

The definitive results for the Beach sediment samples indicate that all downgradient samples yield results that are significantly above background values for at least one of the following radionuclides: ^{137}Cs (one of six samples), ^{228}Th (five of six samples), ^{230}Th (three of six samples), and ^{232}Th (six of six samples) .

The definitive results for the OID sediment samples indicate that eight out of ten downgradient samples yield results that are significantly above background values for at least one of the following radionuclides: ^{228}Th, ^{230}Th, and ^{232}Th.

The definitive results for the Wetlands sediment samples indicate that five out of six downgradient samples yield results that are significantly above background values for at least one of the following radionuclides: ^{137}Cs, ^{40}K, ^{228}Th, ^{230}Th, and ^{232}Th.

All soil and solid waste samples were compared to the six background soil samples collected during this investigation. The definitive results for the residential soil samples indicate that no target radionuclides are significantly above background values. The definitive results for the agricultural soil samples indicate that both samples yield results that are significantly above background values for ^{40}K (both results are within the range observed in background samples) and one sample yields results that are significantly above background for ^{230}Th. The definitive results for the adjacent soil samples from the NCL indicate that seven out of eight samples yield results that are significantly above background values for at least one of the following radionuclides: ^{40}K, ^{228}Th, ^{230}Th, and ^{232}Th.

The definitive results for the Smelter Area soil samples (subsurface and surface samples) indicate that four out of six samples yield results that are significantly above background values for at least one of the following radionuclides: ^{137}Cs, ^{228}Th, ^{230}Th, and ^{232}Th. The definitive results for the WDA solid wastes indicate that two of the four samples yield results that are significantly above background values for at least one of the following radionuclides: ^{40}K, ^{228}Th, ^{230}Th, and ^{232}Th. The definitive results for the WMU solid wastes indicate that six of the 35 samples yield results that significantly exceed background values for at least one of the following radionuclides: ^{137}Cs, ^{228}Th, ^{230}Th, and ^{232}Th. Neither of the two waste samples collected from the Smelter Area significantly exceed the background values for the target radionuclides.

3.2.1.5 VOC Analyses

Of the 40 subsurface samples collected at the Site, WESTON® submitted 14 samples for definitive analyses for VOCs by EPA Method 8260B. The laboratory results for solid matrix samples are presented in Table 3-4 and are broken out by matrix (soil, solid waste) and area. Acetone was detected in all of the solid-matrix samples except SSN4/1. These detections are likely due to a laboratory contaminant. In addition, all detected VOCs are present in concentrations that are approximate, due to their low concentrations with respect to the method detection limit. Laboratory summary data and laboratory data validation reports are included in Appendix H.

The definitive VOC results for soils include four samples collected from the Smelter area at a depth of 1-foot below ground surface (bgs). Sample SSN4/1 exhibited an approximate concentration of 3.1 micrograms per kilogram (ug/kg) tetrachloroethene. Sample SSN5/1 exhibited approximate concentrations of m- and p-xylene (3.5 ug/mg) and o-xylene (1.8 ug/kg). Sample SSN6/1 did not exhibit any additional detectable concentrations. Sample SSN7/1 exhibited approximate concentrations of 1,2,4-trimethylbenzene (18 ug/kg), 1,3,5 trimethylbenzene (7.4 ug/kg), 2-butanone (23 ug/kg), butylbenzene (1.6 ug/kg), carbon disulfide (2.0 ug/kg), isopropylbenzene (2.2 ug/kg), napthalene (1.3 ug/kg), p-isopropyltoluene (2.9 ug/kg), propylbenzene (2.5 ug/kg), and sec-butylbenzene (3.3 ug/kg). Sample locations are plotted on Figures 3-1 and 3-2.

The definitive VOC results for waste samples include ten subsurface samples collected at various depths from the WMU area. Sample SW5-2/15 exhibited a detectable concentration of 5.9 ug/kg carbon disulfide. Sample SW2-1/10 exhibited an approximate concentration of 10 ug/kg tricholorofluoromethane. Sample SW2-3/15 exhibited an approximate concentration of 5.1 ug/kg carbon disulfide. Sample SW3-3/5 exhibited an approximate concentration of 42 ug/kg 2-butanone. Sample locations are plotted on Figures 3-1 and 3-2.

3.2.2 Water Matrix Samples

WESTON® submitted ten unfiltered surface water, and fourteen unfiltered groundwater samples for definitive analysis for metals, radionuclides, and VOCs in accordance with the SAP.

3.2.2.1 Definitive Metals Results

Metals analyses were performed on 24 unfiltered water samples by EPA Method 6010B. Sample results are presented in Table 3-5.

Results of the six surface water samples collected from the OID and the connected water body to the south of the WMU are compared to the four background surface water samples collected upgradient (north) in the OID. Four out of the six samples have results exceeding three-times the highest background concentration for at least one of the following metals: Al, Ba, Cd, Cu, Mg, Mn, V, and Zn.

Results of the groundwater samples are based on a comparison of samples collected from upgradient and downgradient wells. The determination of the groundwater gradient is based on the elevations of groundwater measured in the field in June 2006, and is consistent with previous groundwater sampling performed by Halaco contractors (23). The groundwater gradient and locations of the monitoring wells are shown in Figure 3-3. Groundwater under the site flows broadly to the northeast, except in the northwestern portion of the Site. The groundwater gradient in the northwestern portion of the Site is to the north-northwest, and is interpolated largely from the anomalously low groundwater elevation observed at MW-15. Based on the overall site groundwater gradient, MW-5 is the most upgradient groundwater location on the Site.

The results for the groundwater data are compared to values that are three-times those observed in the background well, MW-5. All eighteen wells yield results exceeding three-times the concentration observed in the background well for at least one of the following metals: Al, Sb, As, Ba, Be, Cd, Co, Cu, Fe, Pb, Mg, Mn, Ni, Ag, V, and Zn.

3.2.2.2 Radionuclides

Laboratory analysis of the target radionuclide suite was performed by EPA 901.1 for ^{137}Cs and ^{40}K, and DOE EML HASL-300, Th-01-RC Modified for ^{228}Th, ^{230}Th, and ^{232}Th on ten surface water and thirteen groundwater samples. The target radionuclide ^{137}Cs was not detected in any of the water samples. The results are presented in Table 3-6 and discussed below.

WESTON® submitted thirteen groundwater samples to the laboratory for definitive analysis; one groundwater sample (MW-17) was not collected due to low sample yield from the well. Based on the determination of background for the groundwater samples, as described above in Section 3.2.2.1, all groundwater data are compared with the results of MW-5. With the exception of ^{40}K, none of the target radionuclides were detected in the background sample. Because there is only one background sample, the ^{40}K results of the downgradient samples are compared to a value that is three-times background, rather than the 2nd StDev.

The results indicate that ^{40}K is elevated with respect to background (660 pCi/L) in seven of the twelve downgradient groundwater locations; the range of exceeding concentrations is 5,540 (MW-16) to 19,800 (MW-12) pCi/L. Thorium isotopes were not detected in the background well location; thorium radionuclides were detected in five downgradient locations at the Site. The highest thorium isotope concentrations detected are in MW-12 (see Table 3-6).

WESTON® submitted ten surface water samples to GEL for definitive analysis for the target radionuclide suite. Four of these locations are hydraulically upgradient of the Site and may be considered background. Of the radionuclide suite, only ^{40}K was detected in two background and three downgradient samples. Because there were so few detections in the background samples, ^{40}K results are compared to a three-times background value, rather than the 2nd StDev. ^{40}K was detected in two downgradient surface water samples at concentrations significantly above background.

3.2.2.3 VOC Analyses

WESTON® submitted 10 surface water samples and 14 groundwater samples to the laboratory for definitive VOCs analysis by CLP Method SOM01.1. The detected compounds are listed in Table 3-7. Acetone was detected in reportable concentrations in 18 of the 24 samples. These detections are likely due to a laboratory contaminant. The results are presented in Appendix H.

Based on the determination of background for the groundwater samples, as described above in Section 3.2.2.1, all groundwater data are compared with the results of MW-5. Background sample MW-5 exhibited concentrations of all VOC analytes that were at or below laboratory detection limits. Chloromethane was detected in sample MW-6 at a concentration of 2.8 micrograms per liter (ug/L). 2-Butanone was detected in samples MW-17 (40 ug/L), MW-18 (7.0 ug/L), and MW-19 (12 ug/L). Benzene was detected in samples MW-12 at a concentration of 0.74 ug/L and MW-19 at a concentration of 0.68 ug/L. Sample locations are plotted on Figures 3-1 and 3-2.

Results of the six surface water samples collected from the OID and the connected water body to the south of the WMU are compared to the four background surface water samples collected upgradient (north) in the OID. The four background samples (WS-7, WS-8, WS-9, WS-10) exhibited concentrations of all VOC analytes that were at or below laboratory detection limits except WS-10, which exhibited an estimated concentration of 0.51 ug/L methyl tert-butyl ether

(MTBE). The six downgradient samples exhibited concentrations of all VOC analytes that were at or below laboratory detection limits.

3.2.3 Air Matrix Samples

Thirty-five air samples were collected from six stations across the Site. The filters were screened for alpha radiation by EPA On-Scene Coordinator (OSC). There were no detections for alpha radiation above background concentrations, therefore none of these samples was submitted for laboratory analysis for radionuclides. The samples were submitted to a laboratory for metals analyses by EPA Method 6010B. The results for the air filter samples are presented in Table 3-8.

Wind directions during the day were generally out of the west, southwest and northwest. As a result, the southwest sampling station, AIR1, may be considered the background location for the duration of the sampling program. Hourly meteorological data from the Oxnard Airport (distance approximately 2 miles) are presented in Appendix E (25).

Metals results in downwind samples are compared to the background values from AIR1. Under the HRS, metals concentrations are considered significantly above background if results are either 1) three-times greater than the concentration detected in the background sample, or 2) detected in the downwind sample when the analyte has not been detected in the background sample at a lower detection limit.

Metals were detected in downwind samples on every day that samples were collected. At least one of the following analytes: Sb, As, Be, Cd, Cu, Pb, Mg, Mn, Ni, Se, and Ag, are significantly elevated with respect to background in samples collected at air sampling stations 2, 3, 4, and 6 during the sampling period. All of these stations are within one quarter mile of the WMU.

3.2.4 Fish Tissue Samples

Nine fish samples were submitted for whole fish analysis for metals and radionuclide analysis. The results indicate that radionuclides were not detected in any of the fish samples. The metals results are presented in Appendix H, and arsenic data are presented in Table 3-9.

4.0 HAZARD RANKING SYSTEM FACTORS

4.1 Sources of Contamination

For HRS purposes, a source is defined as an area where a hazardous substance has been deposited, stored, disposed, or placed, plus those soils that have become contaminated from migration of a hazardous substance.

Potential hazardous substance sources associated with the Halaco site include, but may not be limited to:

- WMU: The WMU covers an area of approximately 14 acres to a height of about 25 feet above the natural ground surface. The volume of the WMU is estimated to be approximately 450,000 cubic yards. The slag in the WMU has concentrations of metals (Al, As, Ba, Be, Cd, Cr, Cu, Pb, Mg, Mn, Ni, Ag, Tl, and Zn) and radionuclides (^{40}K, ^{228}Th, ^{230}Th, and ^{232}Th) significantly above background. In addition, VOCs were detected in samples from the WMU.

  Observations at the WMU indicate that the pile is largely uncovered, except variably along the berm wall surfaces where a soil cover up to 12 inches deep is present. Vegetation does not grow on the exposed surfaces, and is stressed where the cover is present. There is physical evidence of slumping and mass wasting of slag into the adjacent wetlands, NCL, and the OID. In addition, there are bicycle and motorcycle tracks across much of the WMU, indicating that it is regularly used for recreational purposes.

- WDA: The WDA covers an area of approximately 13 acres to a height of about 5 feet above the natural ground surface. The volume of the WDA is estimated to be approximately 112,900 cubic yards. The WDA has concentrations of metals (Al, Ba. Be, Cr, Pb, Mg, Mn, Ni, Ag, and Zn) and radionuclides (^{228}Th, ^{230}Th, and ^{232}Th) significantly above background.

- Smelter Area: The composite slag/waste samples collected in the Smelter Area represent materials in Supersacs$_{TM}$ and slag piles within the process buildings. The total volume of these wastes is estimated at 5,000 cubic yards (Appendix C-1). The Smelter waste has concentrations of metals (Ba, Be, Mg, Mn, and Ag) at concentrations significantly above background. Soil samples from the Smelter Area have concentrations of metals (Al, Ba, Be, Cr, Pb, Mg, Mn, Ni, Ag, and Zn) and radionuclides (^{137}Cs, ^{228}Th, ^{230}Th, and ^{232}Th) at concentrations significantly above background.

- NCL: Contaminated soils are found east of the Site in the NCL, to the south in the wetlands, in beach sediments downgradient of the Site, and in sediments in the OID. Five of the six beach sediment samples exceed three-times background for barium; otherwise, no other metals concentrations exceed three-times background. The definitive results for

the beach sediment samples indicate that all downgradient samples yield results that exceed the 2nd StDev background values for at least one of the following radionuclides: ^{137}Cs, ^{228}Th, ^{230}Th, and ^{232}Th.

4.2 Groundwater Pathway

In determining a score for the groundwater migration pathway, the HRS evaluates: (1) the likelihood that sources at a Site actually have released, or potentially could release, hazardous substances to groundwater; (2) the characteristics of the hazardous substances that are available for a release (i.e., toxicity, mobility, and quantity); and (3) the people (targets) who actually have been, or potentially could be, impacted by the release. For the targets component of the evaluation, the HRS focuses on the number of people who regularly obtain their drinking water from wells that are located within four miles of the Site. The HRS emphasizes drinking water usage over other uses of groundwater (e.g., food crop irrigation and livestock watering), because, as a screening tool, it is designed to give the greatest weight to the most direct and extensively studied exposure routes.

4.2.1 Hydrogeological Setting

The Site lies on the Oxnard Plain Pressure Basin, which is a sub-basin in communication with the greater Oxnard Plain Groundwater Basin. The greater Oxnard Plain Basin is a structural basin bound by the Oak Ridge and San Cayatano faults. The basin fill includes Plio-Pleistocene to Recent sediments infilling an actively growing syncline with sediments from the uplifting Buena Ventura and Santa Monica Mountains, as well as sediments carried in from the Santa Clara River.

Regional groundwater is limited to the fault-bound basin defined by the Oak Ridge and San Cayatano faults, which form an elongate, synclinal structure that runs parallel to the Santa Clara River. Groundwater in the Oxnard Plain Pressure Basin is present in coarse sediments extending to the shoreline of the Pacific Ocean and at least three major aquifer systems, including the Lower and Upper Aquifer systems, and the Semiperched Aquifer Zone. These aquifer systems are intermittently separated by silts and clays of low permeability. The most significant clay layer separates the Semiperched and Upper Aquifer zones intermittently across the Oxnard Plain Pressure Basin, limiting recharge to the Upper Aquifer Zone and protecting it from significant salt water intrusion. All three of these zones are shown to be in hydrologic communication, with aquiclude gaps extending approximately 1 to 2 miles apart (26).

The Site lies on, or within close proximity to, the Semiperched Aquifer Zone, which is consistent with the presence of groundwater observed within 5 to 10 feet bgs in groundwater monitoring wells under the Site. The Semiperched Aquifer and the Upper Aquifer zones communicate within four miles of the Site to the east (27).

Groundwater under the Site appears to be dominated by the outfall lagoon, a portion of the Ormond Beach Lagoon. Based on depth to groundwater in on-site monitoring wells,

groundwater flows generally from the southwest to the northeast across the Site. Groundwater gradient contours are presented in Figure 3-3 and appear to correlate across the OID. This groundwater is likely part of the Semiperched Aquifer Zone. Clustered wells installed at the Site by Pedro and Associates were screened at 5 to 15 feet bgs and 20 to 30 feet bgs, presumably because of their having encountered impermeable materials in the 15 to 20 foot depths. Groundwater measurements indicate that water levels in the adjacent clustered wells are generally within 1 to 3 feet of each other, suggesting that there is not a significant barrier between the 5 to 15-foot and 20 to 30-foot water-bearing units.

4.2.2 Groundwater Targets

The nearest drinking water well is City of Port Hueneme Well #4, located approximately 1.5 miles from the Site (27, Appendix C-2).

The City of Port Hueneme operates a drinking water system that serves 55,000 people. Currently, the city imports 70% of its drinking water from United Water Agency and 30% from the Metropolitan Water District. The city currently has two standby wells that are maintained on a monthly basis. These standby wells are located within four miles of the Site (27, Appendix C-2).

4.2.3 Groundwater Pathway Conclusion

A release of Al, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Ag, Zn, ^{228}Th, ^{230}Th, and ^{232}Th to groundwater beneath the Site has been established, based on the results of the 2006 IA sampling effort. For HRS purposes, a release to groundwater is established when a hazardous substance is detected in a hydraulically downgradient well at a concentration significantly above background levels, and some portion of the release is attributable to the Site. A hazardous substance is considered to be present at a concentration significantly above background levels when one of the following two criteria is met: (1) the hazardous substance is detected in the contaminated sample, when not detected in the background samples or (2) for VOCs and metals, the hazardous substance is detected in the contaminated sample at a concentration equal to or greater than three times the maximum background level, when detected in the background samples, or, for radionuclides, the hazardous substance is detected in the contaminated sample at a concentration equal to or greater than 2 standard deviations above the mean activity level in the background samples.

Selected results from the 2006 IA groundwater sampling event are presented in Tables 3-8 through 3-10. Water level measurements collected during the sampling event indicate that the direction of groundwater flow is toward the northeast. Based on this groundwater flow direction, Well MW-5 is considered a background well, relative to all Site sources. Al, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Ag, Zn, ^{228}Th, ^{230}Th, and ^{232}Th were reported in downgradient wells at concentrations significantly above background. This release is attributable, at least in part, to the

Halaco Site, because these hazardous substances have been detected at elevated concentrations in samples collected from on-site sources.

4.3 Surface Water Pathway

In determining the score for the surface water pathway, the HRS evaluates: (1) the likelihood that sources at a site actually have released, or potentially could release, hazardous substances to surface water (e.g., streams, rivers, lakes, and oceans); (2) the characteristics of the hazardous substances that are available for a release (i.e., toxicity, persistence, bioaccumulation potential, and quantity); and (3) the people or sensitive environments (targets) who actually have been, or potentially could be, impacted by the release. For the targets component of the evaluation, the HRS focuses on drinking water intakes, fisheries, and sensitive environments associated with surface water bodies within 15 miles downstream of the Site.

4.3.1 Hydrological Setting

The OID bisects the Site, separating the Smelter Area and the WMA side; a bridge constructed across the OID links these two areas of the Site. In addition, a slurry pipe once moved waste material from the Smelter side to the WMU (Appendix B).

The OID flows from the northeast and empties into a lagoon that runs along the southern boundary of the Site. The OID was approximately 2 feet deep in early April 2006, and over 9 feet deep in June 2006, during the IA sampling event. This difference in water level probably represents variations in irrigation in the upgradient agricultural lands. The OID drains agricultural, industrial, and residential lands to the north and northeast of the Site (28). In addition, the stretch of the OID that crosses the Site is believed to be tidally influenced, and may flow in reverse during parts of the tidal cycle (2, Appendix B).

The lagoon along the southern boundary of the Site is a variable-salinity waterbody that is characterized seasonally by freshwater, brackish and saline conditions. The lagoon covers approximately 20 acres and is surrounded by wetlands to the east, west, and north, where it extends beyond the site. It is bound to the south by a sand barrier, and it communicates with the ocean intermittently; the lagoon was cut off from the ocean by the barrier bar during the field investigation in June 2006 (Appendix B).

There is a small body of standing water that runs along the southern side of the WMU. This water body is approximately five to eight feet across and about 200 to 300 feet long, depending on rainfall. This water body lies within the wetlands to the south of the Site and intermittently connects with the OID, and is likely artesian in nature (Appendix B).

Surface water on the Smelter side of the Site generally flows toward the OID. Halaco constructed berms around much of the facility to divert water to the OID and/or keep run-off water from flowing into Perkins Road (Appendix B).

Surface water on the WMA side of the Site flows toward the OID on the west side, or the NCL to the east of the Site, depending on the topographic gradient. Surface water flow at the WMU is restricted by berms constructed primarily of waste material. The result is a series of three ponds in the WMU where surface water is contained. Surface water is believed to percolate into the underlying groundwater in this area, leaching metals and radionuclides from the WMU in the process. Surface water along the bermwall surface flows either into the OID or the NCL, depending on the side of the WMU; this is somewhat restricted to the south and east by a perimeter of silt fences and straw booms. Large chunks of slag appear to have rolled and/or slid off the sides of the berm, mingling with the adjacent Site soils and wetlands sediments (Appendix B).

The berm around the WDA is breached in two areas: near the bridge that crosses the OID, and at the road near the northeast corner of the WMU. Surface water flows from the Site in these areas; it is unclear whether these points drain the entire WDA (Appendix B).

In addition, slag material may be found in the walls of the OID. Mass wasting of this material into the OID during flood stage may be a primary mechanism of contaminant migration into the surface water pathway (Appendix B).

4.3.2 Surface Water Targets

The OID and Pacific Ocean are not used as drinking water sources. The OID and lagoon are used for recreational fishing. The Pacific Ocean within 15 miles of the Site is used for recreational and commercial fishing. The lagoon is documented habitat for several federally-designated endangered species, including the California Least Tern (*Sterna antillarum browni*), the Tidewater Goby (*Eucyclogobius newberryi*), and the Western Snowy Plover (*Charadrius alexandrinus* nivosus). The area between the southern end of the Halaco Site and the Pacific Ocean is considered to be wetlands (27, 28, 29).

4.3.3 Surface Water Pathway Conclusion

A release of Al, Ba, Be, Cd, Cr, Cu, Pb, Ni, Zn, ^{228}Th, ^{230}Th, and ^{232}Th to the OID has been established, based on the results of the 2006 IA sampling effort. A release of Al, Be, Cd, Cr, Cu, Co, Pb, Mn, Ni, Zn, ^{40}K, ^{228}Th, ^{230}Th, and ^{232}Th to the wetlands south of the Site has been established, based on the results of the 2006 IA sampling effort. For HRS purposes, a release to surface water is established when a hazardous substance is detected in a downstream location at a concentration significantly above background levels, and some portion of the release is attributable to the Site. A hazardous substance is considered to be present at a concentration significantly above background levels when one of the following two criteria is met: (1) the hazardous substance is detected in the contaminated sample, when not detected in the background samples; (2) for VOCs and metals, the hazardous substance is detected in the contaminated sample at a concentration equal to or greater than three times the maximum background level, when detected in the background samples; or (3) for radionuclides, the

hazardous substance is detected in the contaminated sample at a concentration equal to or greater than 2 standard deviations above the mean activity level in the background samples.

Selected results from the 2006 IA sampling event are presented in Tables 3-2, 3-3, 3-8 and 3-9. Al, Be, Cd, Cr, Cu, Co, Pb, Mn, Ni, Zn, ^{137}Cs, ^{40}K, ^{228}Th, ^{230}Th, and ^{232}Th were reported in downstream locations at concentrations significantly above background. This release is attributable, at least in part, to the Halaco Site, because these hazardous substances have been detected at elevated concentrations in samples collected from on-site sources. In addition, there is physical evidence of slumping and mass wasting of waste material into the adjacent wetlands, NCL, and the OID.

4.4 Soil Exposure and Air Migration Pathways

In determining the score for the soil exposure pathway, the HRS evaluates: (1) the likelihood that surficial contamination is associated with the Site (e.g., contaminated soil that is not covered by pavement or at least 2 feet of clean soil); (2) the characteristics of the hazardous substances in the surficial contamination (i.e., toxicity and quantity); and (3) the people or sensitive environments (targets) who actually have been, or potentially could be, exposed to the contamination. For the targets component of the evaluation, the HRS focuses on populations that are regularly and currently present on or within 200 feet of surficial contamination. The four populations that receive the most weight are residents, students, daycare attendees, and terrestrial sensitive environments.

In determining the score for the air migration pathway, the HRS evaluates: (1) the likelihood that sources at a site actually have released, or potentially could release, hazardous substances to ambient outdoor air; (2) the characteristics of the hazardous substances that are available for a release (i.e., toxicity, mobility, and quantity); and (3) the people or sensitive environments (targets) who actually have been, or potentially could be, impacted by the release. For the targets component of the evaluation, the HRS focuses on regularly occupied residences, schools, and workplaces within 4 miles of the Site. Transient populations, such as customers and travelers passing through the area, are not counted.

Observed contamination of metals (Al, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Ag and Zn) and radionuclides (^{137}Cs, ^{228}Th, ^{230}Th and ^{232}Th) has been documented in surface soils from the WMU, WDA, and Smelter area. In 2004, all Site operations ceased, and employees were terminated. The Site is accessible to joggers and off-road vehicles; evidence of this was observed by EPA during a March 2006 site visit. There are bicycle and motorcycle tracks across much of the WMU, indicating that it is regularly used for recreational purposes. A field biologist under contract with DFG has observed the federally endangered California Least Tern (*Sterna antillarum browni*), the federally endangered Western Snowy Plover (*Charadrius alexandrinus nivosus*), and the State of California endangered Belding's Sevanah Sparrow (*Passerculus sandwichensis beldingi*) nesting and foraging in the areas surrounding the Halaco Site (31).

An observed release of Sb, As, Be, Cd, Cu, Pb, Mg, Mn, Ni, Se, and Ag to air has been documented. Wind directions during the day were generally out of the west, southwest and northwest.

5.0 EMERGENCY RESPONSE CONSIDERATIONS

CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan authorizes EPA to consider removal actions at those sites that pose a threat to public health or welfare or the environment. The data goals for this IA investigation are designed to also meet the needs of the EPA Emergency Response Section's evaluation of the Site for removal criteria. Waste, surface water, surface sediment, beach sediment, adjacent soil, and wetlands sediment samples provide data that can be used to compare with matrix specific action levels in order to assess the threat posed by wastes at the Site to human health and the environment. EPA is currently evaluating the need for further removal activities at the Halaco Site. Data and observations pertinent to this effort are contained in the Halaco Engineering Company IA Technical Addendum, which is included as Appendix J.

6.0 SUMMARY

The Halaco facility (the Site), located at 6200 Perkins Road, Oxnard, California, abuts the Ormond Beach wetlands and is in close proximity to the Ormond Beach Lagoon, Ormond Beach, and the Pacific Ocean. The Ormond Beach wetlands are one of the few large-scale wetlands that remain along California's southern coast. These coastal wetlands are home to several endangered or threatened species, including the western snowy plover and the California least tern.

The Halaco facility is an abandoned metal recycling facility bisected by the Oxnard Industrial Drain (OID) that operated from 1965 until 2004. Scrap metal, including radioactive material, was processed at the smelter portion of the facility located on the west side of the OID. Halaco process wastes were disposed of in the OID, on the waste disposal parcel located on the east side of the OID, and later on the smelter parcel.

The federal, state, and local regulatory history of this Site is voluminous. In addition to the EPA and Army Corps of Engineers (USACE) enforcement actions under the Clean Water Act (CWA), the California Department of Toxic Substances Control (DTSC), the Los Angeles Regional Water Quality Control Board (LARWQCB), the California Department of Health Services Radiologic Health Branch (RHB), the Ventura County Air Pollution Control District (VCAPCD), the Ventura County District Attorney, and the City of Oxnard have initiated administrative, civil, and/or criminal actions against Halaco for alleged regulatory violations. Additionally, nonprofit public interest organizations have sued Halaco.

The EPA is investigating the Site for consideration under both the Hazard Ranking System (HRS) and for potential removal/stabilization actions by the Emergency Response Section. This investigation collected solid (waste, sediment, and soil), water (surface water, groundwater), air, and fish tissue samples from the Site, adjacent parcels, agricultural parcels, residential parcels, and wetlands, surface water, beach, and marine environments. The following pertinent HRS factors are associated with the Site:

- Analyses of the soils, wetland sediments, surface water sediments, beach sediments, and surface water samples indicate that several metals and radionuclides are significantly elevated with respect to background. The OID and lagoon are used for recreational fishing. The Pacific Ocean within 15 miles of the Site is used for recreational and commercial fishing. The lagoon is documented habitat for several federally-designated endangered species, including the California Least Tern (*Sterna antillarum browni*), the Tidewater Goby (*Eucyclogobius newberryi*), and the Western Snowy Plover (*Charadrius alexandrinus* nivosus). The area between the southern end of the Halaco Site and the Pacific Ocean is considered to be wetlands (27, 28, 29).

- Analyses of the groundwater under and downgradient of the Site indicate that several metals and radionuclides are significantly elevated with respect to background. The nearest drinking water well is City of Port Hueneme Well #4, located approximately 1.5 miles from the Site (27, Appendix C-2). The City of Port Hueneme operates a drinking

water system that serves 55,000 people. The city currently has two standby wells located within four miles of the Site that are maintained on a monthly basis (27, Appendix C-2).

- Analysis of air samples indicate at least one of the metals (Ba, Be, Cr, Cu, Pb, Mo, Ni, V, and Zn) was detected at concentrations significantly above background in four samples collected on three separate days.

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Table 3-1: XRF Data Summary

Matrix	Type		Sb		As		Ba		Cd		Cr		Co		Cu	
			low	high	low	high	low	high	low	high	low	high	low	high	low	high
	PRGr		31	31	22	22	5400	5400	37	37	210	210	900	900	3100	3100
	TTLC		500	500	500	500	10000	10000	100	100	2500	2500	8000	8000	2500	2500
		No. of samples	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Soil	res and ag	18	(47)	83	(6)	10	760	956	(21)	(28)	(82)	187	(87)	(132)	(51)	107
	adjacent	40	(49)	101	(7)	16	573	5824	(21)	(35)	(81)	268	(61)	135	81	3115
	site	62	(48)	155	(4)	108	350	15850	(20)	(52)	(44)	673	(27)	212	(52)	11048
	background	6	(59)	107	(7)	8	310	763	(24)	(27)	(88)	114	(108)	(181)	(55)	110
Sediment	wetlands	29	(50)	119	(6)	27	741	4770	(22)	(32)	(72)	317	(59)	(106)	86	5124
	bkgd wetlands	6	(48)	85	(6)	8	768	1470	(22)	(27)	(79)	138	(74)	(100)	52	129
	beach	27	(44)	67	(6)	9	547	1009	(20)	(26)	(74)	960	(54)	(199)	(47)	149
	bkgd beach	6	(46)	(57)	(6)	(6)	670	828	(20)	(22)	82	123	(55)	(66)	(46)	78
	marine	19	(47)	54	(6)	(7)	866	951	(20)	(25)	(78)	147	(71)	(98)	(51)	112
	bkgd marine	8	(49)	53	(7)	10	866	950	(21)	(24)	(87)	165	(91)	(99)	(54)	108
	OID	6	(48)	66	(6)	(8)	517	1180	(22)	(29)	(84)	481	(65)	(165)	78	314
	bkgd OID	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste		110	(49)	222	(3)	29	254	48316	(21)	60	(42)	880	(25)	119	(55)	9660
R value			0.3		0.47		0.83		NA		0.08		NA		0.98	

Matrix	Type	Fe		Pb		Mn		Mo		Ni		Ag		Zn	
		low	high	low	high	low	high	low	high	low	high	low	high	low	high
	PRGr	-	-	150	150	1800	1800	-	-	1600	1600	390	390	23000	23000
	TTLC	-	-	1000	1000			3500	3500	2000	2000	500	500	5000	5000
		min	max	min	max	min	max	min	max	min	max	min	max	min	max
Soil	res and ag	10875	22060	19	81	251	503	(2)	(2)	(71)	(79)	(104)	195	(37)	51
	adjacent	4626	18504	19	210	255	3304	(2)	10	(67)	551	(109)	225	(41)	4242
	site	307	241690	12	2574	(54)	8250	(1)	14	(42)	865	(107)	309	(37)	10167
	background	16482	38620	20	48	180	508	(2)	(3)	(75)	95	(123)	199	(42)	127
Sediment	wetlands	5251	16041	23	520	299	2671	(2)	15	(58)	194	(110)	290	(64)	4954
	bkgd wetlands	7189	14275	16	52	173	511	(1)	(2)	(69)	(77)	(108)	168	(36)	155
	beach	3016	46805	9	29	(67)	1458	(1)	7	(65)	98	(102)	240	(33)	(53)
	bkgd beach	3107	5278	8	15	76	206	(1)	(2)	(65)	(67)	(102)	173	(34)	(34)
	marine	6241	12828	17	23	142	279	(1)	(3)	(70)	(78)	(106)	215	(37)	(41)
	bkgd marine	10956	13019	18	29	205	322	(2)	(3)	(75)	(79)	(109)	113	(40)	(41)
	OID	4851	33978	19	59	176	626	(1)	7	(70)	92	(106)	132	(38)	608
	bkgd OID	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste		456	18375	4	531	180	9571	(1)	38	(39)	489	(109)	342	(41)	6654
R value		0.89		0.73		0.91		0.62		0.63		0.02		0.9	

Notes: All data are in miligrams per kilogram. ag = agricultural soils. OID = Oxnard Industrial Drain - Surface Sediments. TTLC = Total Threshold Level Concentration

res = residential soils. bkgd = background. R value is the correlation coefficient (see text). PRGr = Preliminary Remediation Goal

() indicate that the result is below the method detection limit. The reported number is the method detection limit.

Table 3-2: Metals Analysis - Solid Matrix

Prefix	Matrix	Area	Bkgd	Aluminum		Antimony		Arsenic		Barium		Beryllium		Cadmium		Chromium		Cobalt		Copper		Lead		Magnesium		Manganese		Nickel		Silver		Vanadium		Zinc	
			PRGr	76,000		31		2.2		5,400		150		37		210		900		3,100		150		-		1,800		1,600		390		550		23,000	
			TTLC	-		15		500		10,000		75		100		2,500		8,000		2,500		1,000		-		-		2,000		100		2400		5,000	
			SQuiRT	-		-		7.2		-		-		0.676		52.3		-		18.7		30.24		-		-		15.9		7.3		-		124	
				Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
SDB31	SED	Beach	bkgd	1760		6.2	U	2.5		33.7		0.1	J	0.51	U	3.5		1.4	J	2.4	J	1.8		1420		70		4	J	1.0	U	6.4		10.5	
SDB32	SED	Beach	bkgd	1410		0.79	J	2.1		51.1		0.1	J	0.51	U	4.9		1.2	J	1.9	J	1.6		1140		57		3.4	J	1.0	U	5.9		8.2	
SDB33	SED	Beach	bkgd	1350		6.2	U	1.1		26.9		0.1	J	0.51	U	4.2		1.1	J	1.7	J	1.2		1150		50		3.4	J	1.0	U	5.1	J	7.8	
SDB34	SED	Beach	bkgd	1500		6.2	U	1.3		28.1		0.1	J	0.52	U	4		1.2	J	2	J	1.3		1380		65		3.6	J	1.0	U	5.7		8.7	
SDB35	SED	Beach	bkgd	1630		6.2	U	1.9		57.2		0.1	J	0.52	U	4.6		1.3	J	2.3	J	1.8		1340		66		4.1	J	1.0	U	6.6		10.1	
SDB36	SED	Beach	bkgd	1500		6.2	U	2.1		41.2		0.1	J	0.52	U	3.4		1.2	J	2	J	1.6		1180		59		3.7	J	1.0	U	7.1		8.9	
3xBkgd	**SED**	**Beach**	**bkgd**	**5280**		**2.4**		**7.5**		**171.6**		**0.3**		**1.5**		**14.7**		**4.2**		**7.2**		**5.4**		**4260**		**210**		**12.3**		**3.0**		**21.3**		**31.5**	
SDB17	SED	Beach		2160		6.2	U	4		**246**		0.2	J	0.17	J	10.7		2.2	J	3.4		4.6		1830		109		5.5		1.0	U	14.3		13.2	
SDB18	SED	Beach		2510		6.2	U	4.6		**278**		0.2	J	0.21	J	12.9		2.8	J	3.5		5.1		2000		120		6.6		1.0	U	17.1		15.8	
SDB20	SED	Beach		2200		6.2	U	4.8		**297**		0.2	J	0.46	J	**18.3**		2.7	J	3.6		5.4		1760		112		6.2		1.0	U	17.8		14.8	
SDB23	SED	Beach		1820		6.2	U	3.4		**253**		0.2	J	0.05	J	10		2.3	J	3.1		4.4		1730		92		5.1		1.0	U	19.4		11.5	
SDB26	SED	Beach		1750		6.2	U	2.9		**200**		0.2	J	0.04	J	9.1		1.9	J	2.9		3.4		1460		88		4.7		1.0	U	13		11.4	
SDB30	SED	Beach		1770		6.2	U	2		81.9		0.1	J	0.52	U	5.7		1.6	J	2.5	J	2.5		1420		75		4.4		1.0	U	7.7		10.4	
SDM1	SED	Marine	bkgd	8120		7.8	U	7.2		332		0.5	J	0.15	J	18.9		6.4	J	9.2		8.2		6510		274		16.3		1.3	U	34.9		49.4	
SDM2	SED	Marine	bkgd	4020		7.8	U	3.6		106		0.2	J	0.65	U	9.3		3.3	J	4.3		3.3		3310		132		8.2		1.3	U	16.8		24.9	
SDM3	SED	Marine	bkgd	3440		7.9	U	2.7		79.3		0.2	J	0.66	U	8.1		2.7	J	3.8		2.8		2880		119		7.6		1.3	U	13.6		21	
SDM4	SED	Marine	bkgd	4300		7.7	U	6.1		136		0.3	J	0.04	J	10.1		4	J	5.6		3.8		3480		148		9.8		1.3	U	21.2		27.2	
SDM5	SED	Marine	bkgd	5440		7.8	U	5		85.9		0.3	J	0.12	J	11.7		4.4	J	5.9		4.9		4430		185		11.4		1.3	U	20.9		34.4	
SDM6	SED	Marine	bkgd	5440		7.9	U	3.5		200		0.3	J	0.42	J	11.7		3.7	J	5		5.4		4210		185		10.4		1.3	U	21		30.9	
3xBkgd	**SED**	**Marine**	**bkgd**	**24360**		**23.7**		**21.6**		**996.0**		**1.4**		**1.3**		**56.7**		**19.2**		**27.6**		**24.6**		**19530**		**822**		**48.9**		**3.9**		**104.7**		**148.2**	
SDM14	SED	Marine		4350		7.9	U	2.5		137		0.2	J	0.31	J	10		3.3	J	4		4.9		3470		149		8.7		1.3	U	17.3		25.4	
SDM16	SED	Marine		4340		7.9	U	3.4		81.1		0.2	J	0.3	J	9.4		3.2	J	4.2		4.1		3490		139		8.3		1.3	U	17.2		25.7	
SDM21	SED	Marine		4120		7.7	U	2.2		46.1		0.2	J	0.3	J	10.1		2.9	J	3.9		3.5		3410		134		9.6		1.3	U	14.6		24.4	
SDM23	SED	Marine		3520		7.8	U	2.1		47.9		0.2	J	0.32	J	8.5		2.4	J	3.7		3.1		3180		115		8.8		1.3	U	13.1		21.9	
SDM24	SED	Marine		5360		8	U	3.5		90.7		0.3	J	0.48	J	11.8		3.7	J	4.9		4.9		4300		180		10.7		1.3	U	19		31.7	
SDM26	SED	Marine		3350		7.6	U	3		154		0.2	J	0.64	U	7.8		2.6	J	3.8		2.5		2680		114		7.1		1.3	U	14.1		19.5	
SWL31	SED	Wetlands	bkgd	5810		6.4	U	1.3		748		2.8		1		17.2		3	J	76.5		35		8720		322		12.2		1.1	U	14.2		138	
SWL32	SED	Wetlands	bkgd	3050		0.64	J	1.6		91.8		0.3	J	0.63		6.9		2.7	J	11.2		13.5		2280		197		7.8		1	U	11.5		35.3	
SWL33	SED	Wetlands	bkgd	1510		8.5	U	1.4	U	22	J	0.1	J	0.19	J	3.7		1.3	J	3.5	J	4.3		1930		55		3.6	J	1.4	U	6	J	17.4	
SWL34	SED	Wetlands	bkgd	4130		7.4	U	1.9		174		0.4	J	0.83		9.3		3	J	18.3		28.7		3440		286		10		1.2	U	14.2		78.6	
SWL35	SED	Wetlands	bkgd	2720		8.3	U	0.72	J	111		0.5	J	0.43	J	6.4		1.9	J	13.4		17.3		2460		119		6.3		1.4	U	9		47.5	
SWL36	SED	Wetlands	bkgd	3210		6.1	U	1.8		222		0.8		0.57		7.4		2.2	J	20.3		18.3		2910		200		7		1	U	10.3		50.4	
3xBkgd	SED	Wetlands	bkgd	**17430**		**25.5**		**5.7**		**2244.0**		**8.4**		**3.0**		**51.6**		**9.0**		**229.5**		**105.0**		**26160**		**966**		**36.6**		**4.2**		**42.6**		**414.0**	
SWL3	SED	Wetlands		96400		8.1	J	4.3		3560		**9.7**		**3.1**		**166**		7	J	**2120**		**164**		**69900**		**1530**		**81.8**		1.4	U	41.1		**1860**	
SWL5	SED	Wetlands		**205000**		9	U	1.5		2760		8.0		**5.9**		**343**		**11.4**		**4720**		**473**		**65200**		**2120**		**210**		1.5	U	**83**		**3010**	
SWL13	SED	Wetlands		**104000**		11.9	U	1.2	J	1310		7.1		**3.5**		**213**		7.3	J	**2440**		**263**		22000		879		**114**		2	U	**42.6**		**1890**	
SWL19	SED	Wetlands		**187000**		12.7	U	2.1	U	1730		**10.8**		**9.6**		**446**		**10.4**	J	**5170**		**553**		**26700**		**1640**		**227**		2.1	U	**68.2**		**3810**	
SWL21	SED	Wetlands		**199000**		11.8	J-	3.3		2300		**19.7**		**17**		**503**		**12.2**		**5960**		**736**		**60500**		**2980**		**244**		1.1	U	**68.9**		**5210**	
SWL22	SED	Wetlands		**135000**		9.2	J-	**7.1**		4620		**10.3**		**3.6**		**281**		**10.3**		**2690**		**305**		**64700**		**1730**		**124**		1.6	U	**54.9**		**2520**	
SDF11	SED	OID	bkgd	1520		8.1	U	1.3	U	25	J	0.1	J	0.41	J	3.2		1.4	J	5.6		3.2		1310		98		3.4	J	1.3	U	4.8	J	40.1	
SDF12	SED	OID	bkgd	1580		7.9	U	0.74	J	15.6	J	0.1	J	0.37	J	2.7		1.2		4.5		3.3		1150		87		3.1	J	1.3	U	4.8		48.6	
SDF13	SED	OID	bkgd	246		8	U	1.3	U	0.35	J	0.2	J	0.67	U	1.3	U	6.7	U	8.5		2.4		669	U	0	J	0.37	J	4.1		5.5	J	2.2	J
SDF14	SED	OID	bkgd	3100		8.3	U	1.6		50.1		0.2	J	0.71		7.3		2.8	J	18		10.6		3420		282		7.9		1.4	U	11.6		136	
SDF15	SED	OID	bkgd	1750		7.6	U	0.54	J	26.7		0.1	J	0.36	J	3.2		1.8	J	6.8		3.2		1820		126		4.5	J	1.3	U	6.5		136	
SDF16	SED	OID	bkgd	8580		8.4	U	9.2		147		0.5	J	0.98		16.2		7.1		30.2		23.2		6680		555		18.4		1.4	U	31		119	
3xBkgd	SED	OID	bkgd	**25740**		**25.2**		**27.6**		**441.0**		**1.5**		**2.9**		**48.6**		**21.3**		**90.6**		**69.6**		**20040**		**1665**		**55.2**		**12.3**		**93.0**		**408.0**	
SDF1	SED	OID		19600		10.5	U	11.9		195		1.2		0.67	J	32.6		11.7		41.8		14		13100		323		36.6		1.8	U	59.8		119	
SDF2	SED	OID		1960		7.7	U	1	J	40.3		0.2	J	0.39	J	5.7		1.7	J	13.3		3.6		1800		120		5	J	1.3	U	6.5		44.7	
SDF3	SED	OID		10400		9.8	U	2.5	J-	348		1.3		0.83		23.3		5.2	J	**161**		29.6		8120		350		18.8		1.6	U	22.1		350	
SDF4	SED	OID		2160		7.8	U	0.93	J	39.9		0.2	J	0.07	J	6.1		1.3	J	15.4		3.4		1400		69		5.4		1.3	U	6.8		28.8	
SDF5	SED	OID		18400		10.4	U	4.6		294		1.7		0.84	J	35.7		8.1	J	**250**		29.4		11600		639		29.4		1.7	U	36.4		271	

Table 3-2: Metals Analysis - Solid Matrix

Prefix	Matrix	Area	Bkgd	Aluminum		Antimony		Arsenic		Barium		Beryllium		Cadmium		Chromium		Cobalt		Copper		Lead		Magnesium		Manganese		Nickel		Silver		Vanadium		Zinc	
			PRGr	76,000		31		2.2		5,400		150		37		210		900		3,100		150		-		1,800		1,600		390		550		23,000	
			TTLC	-		15		500		10,000		75		100		2,500		8,000		2,500		1,000		-		-		2,000		100		2400		5,000	
			SQuiRT	-		-		7.2		-		-		0.676		52.3		-		18.7		30.24		-		-		15.9		7.3		-		124	
				Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
SDF6	SED	OID		7800		14.3	U	4.5		155		1.2	J	0.98	J	19.4		4.5	J	82.5		24.2		6690		543		16.1		2.4	U	25.8		238	
SDF7	SED	OID		14300		11.4	U	6.6		**705**		2.3		1.8	J	27.4		9.1	J	61.3		**92.6**		**24900**		1070		24.7		1.9	U	45.9		257	
SDF8	SED	OID		13200		9.7	U	5.5		**2970**		**7.6**		1.2		24.8		9.5		67.1		16.5		**22000**		1040		22		1.6	U	38.8		212	
SDF9	SED	OID		**47000**		2.2	J	7.4		**2480**		**10.3**		**2.9**		**108**		11.9		**854**		**139**		**52400**		1450		**73.4**		1.4	U	59.6		**1450**	
SDF10	SED	OID		7670		8.4	U	2		**465**		1.7		0.51	J	28.1		3.4	J	**144**		49.4		6610		337		21.5		1.4	U	14.8		254	
SSN94	Soil	soil	bkgd	16400		6.6	U	2.7		54.6		0.4	J	0.18	J	22.1		19.8		30.9		8		13600		643		24.7		1.1	U	50.1		75.7	
SSN95	Soil	soil	bkgd	10400		6.3	U	4.4		170		0.6		0.83		21.8		7.7		37.3		28		6870		328		20.7		1	U	34.7		145	
SSN96	Soil	soil	bkgd	9820		6.5	U	5.1		155		0.6		1.1		19.1		7.9		32.1		25.6		8690		457		20.7		1.1	U	34.5		118	
SSN97	Soil	soil	bkgd	10800		6.6	U	5.9		220		0.6		1.3		29.7		8.1		61.4		39.1		9810		300		22.2		2		36.2		242	
SSN98	Soil	soil	bkgd	10200		6.1	U	3.5		142		0.6		1.4		18.4		7.6		22.8		17.6		7450		342		20.5		1	U	33.8		83.2	
SSN99	Soil	soil	bkgd	9140		6.5	U	2.4		139		0.5	J	0.91		17.5		6.8		24.8		19		12300		245		17.4		1.1	U	28.9		93.5	
3xBkgd	**Soil**		**bkgd**	**49200**		**20**		**18**		**660**		**1.9**		**4**		**89**		**59**		**184**		**117**		**40800**		**1929**		**74**		**6**		**150**		**726**	
SSN54	Soil	NCL-east		**121000**		4.5	J	3.6		**1820**		**8.4**		**4.3**		**344**		8.6		**3750**		**246**		**77500**		**5720**		**199**		1.3	U	41.2		**5200**	
SSN55	Soil	NCL-east		16300		6.9	U	3.2		296		1.5		0.56	J	34.1		6.1		169		53.4		19100		426		30.5		1.1	U	34.3		253	
SSN58	Soil	NCL-east		**79200**		6.4	J	9.7		**6190**		**15.9**		4		**119**		7.7	J	**1020**		**149**		**111000**		**2210**		51.7		1.6	U	46.4		**1240**	
SSN60	Soil	NCL-east		**82400**		3.5	J	4.9		**2680**		**10.2**		**5.1**		**167**		8.8		**1620**		**207**		**61500**		**2700**		**87.7**		1.5	U	48.5		**1660**	
SSN62	Soil	NCL-east		**80600**		4.2	J	2		**1880**		**7.3**		2.6		**167**		8.6		**1470**		**136**		**48100**		**2210**		**90.9**		1.3	U	51.3		**1230**	
SSN74	Soil	NCL-east		**174000**		5.7	J	0.54	J	**1220**		**6.7**		**6**		**315**		8.2		**3500**		**238**		35200		1600		**163**		1.3	U	56.7		**2520**	
SSN75	Soil	NCL-east		**114000**		6.7	J	6.6		**2290**		**12.5**		**5.9**		**363**		9.6		**3790**		**250**		**58200**		**2610**		**265**		1.2	U	44.7		**5950**	
SSN86	Soil	NCL-east		**67300**		4.3	J	3.8		**2540**		**13.4**		3.4		**147**		8.7		**1370**		**160**		**47200**		**2030**		**88.2**		1.4	U	42		**1590**	
SSN15	Soil	Smelter		**72800**		7.5	U	1.2	U	**5960**		**26.4**		**5.9**		**318**		12.4		**2220**		**205**		**109000**		**4520**		**164**		1.2	U	45.6		**3260**	
SSN1-1	Soil	Smelter		**62500**		6.9	U	1	J	**831**		**17.9**		2.9		**107**		3.7	J	**954**		84.3		32500		**6110**		41.5		1.1	U	26.7		**1140**	
SSN2-8	Soil	Smelter		16300		3.2	J	14.1		**682**		0.2	J	**14.5**		47.7		15.5		**1400**		**7280**		4360		597		57.9		5.4		21.6		**22900**	
SSN5-8	Soil	Smelter		10200		12.9	J	16.5		**6920**		0.2	J	**12.8**		67.6		23.3		**560**		**1840**		4970		1140		**95.9**		3.8		20.2		**5160**	
SSN10-1	Soil	Smelter		8770		3.2	J	**19.9**		413		0.2	J	**11.7**		44		21.8		**555**		**1720**		3410		732		63.7		1.9		18.3		**1700**	
SSN33-8	Soil	Smelter		**120000**		14.0	U	**19**		**3700**		**21.0**		**4.7**		**350**		3.7		**2000**		**200**		**110000**		**4000**		**140**		**14.0**		55		**3000**	
SSA7	Soil	Ag		7020		6.2	U	3.5		105		0.4	J	1.3		14.4		5.3		16.3		9.6		4260		254		14.8		1	U	25		52.9	
SSA8	Soil	Ag		7100		6.2	U	3.6		101		0.4	J	1		13		5.3		16.1		8.3		4260		256		14.4		1	U	24.7		53.4	
SSR6	Soil	RES		11600		8.1	U	4.9		179		0.6	J	0.78		19.1		8.7		27.9		17.7		6770		359		21.2		1.4	U	39.6		82.5	
SSR8	Soil	RES		4320		0.88	J	2.5		93.5		0.3	J	0.5		8.7		3.5	J	13.6		47.8		2540		179		10.9		1	U	16.8		66.5	
SSN35	Waste	Waste Disposal		**120000**		11.0	U	5.4		**3200**		**65.0**		**5.8**		**350**		4.0		**2800**		**170**		**100000**		**3900**		**200**		**8.9**		32		**2500**	
SSN40	Waste	Waste Disposal		**110000**		11.0	U	7.2		**4600**		**51.0**		**4.3**		**260**		2.2	U	**1700**		**190**		**82000**		**3500**		**120**		**9.2**		51		**1700**	
SSN49	Waste	Waste Disposal		27000		11.0	U	2.3		**49000**		**22.0**		0.56		40		2.2	U	120		10		**160000**		**8500**		50		5.6		21		**1100**	
SSN51	Waste	Waste Disposal		**57000**		13.0	U	7.5		**3600**		**27000**		**26**		**1700**		8.2		**1700**		**300**		**140000**		**6800**		**610**		**62.0**		68		**1500**	
SWF1	Waste	Smelter		26000		12.0	U	1.2	U	310		**70.0**		0.6	U	19		2.4	U	130		8.1		**190000**		**4600**		13		5.4		5.5		550	
SWF5	Waste	Smelter		24000		12.0	U	1.7		**980**		**120.0**		0.6		23		2.4	U	80		8.9		**250000**		**6700**		18		**8.2**		11		550	
SW1-1-20	Waste	WMU		**120000**		15.0	U	6.3		**9700**		**23.0**		**5.7**		**220**		3.0	U	**1700**		**280**		**81000**		**2400**		**96**		4.8		49		**1500**	
SW1-2-15	Waste	WMU		**190000**		11.0	U	4.4		380		**4.0**		3.7		**390**		6.5		**2500**		**220**		23000		1500		**150**		2.4		55		**2000**	
SW1-4-10	Waste	WMU		**190000**		13.0	U	7.5		**3100**		**10.0**		**7.4**		**370**		5.8		**4000**		**390**		**56000**		**2000**		**180**		5.5		64		**2600**	
SW1-4-5	Waste	WMU		**63000**		16.0	U	8.2		**13000**		**48.0**		**9.6**		**110**		3.3	U	**880**		**210**		**180000**		**3900**		53		**8.2**		23		**1000**	
SW1-5-5	Waste	WMU		**120000**		17.0	U	10		**12000**		**41.0**		**5.5**		**210**		3.4	U	**1300**		**210**		**120000**		**3300**		70		**6.3**		48		**1200**	
SW1-6-20	Waste	WMU		**130000**		16.0	U	9		**8300**		**21.0**		**5.1**		**310**		3.2	U	**1800**		**210**		**95000**		**2000**		**140**		3.5		51		**1600**	
SW1-7-15	Waste	WMU		**97000**		18.0	U	9.4		**10000**		**25.0**		**5.4**		**240**		3.6	U	**1300**		**240**		**110000**		**2000**		72		3.5		45		**1100**	
SW2-1-20	Waste	WMU		7800		11.0	U	2.8		130		0.4		0.58		16		4.1		18		5.3		4100		220		13		1.1	U	26		42	
SW2-2-20	Waste	WMU		8400		11.0	U	2.9		140		0.4		0.72		15		4.5		15		4		4800		240		14		1.1	U	29		40	
SW2-3-15	Waste	WMU		**120000**		14.0	U	14		**11000**		**14.0**		3.8		**240**		2.8	U	**1600**		**180**		**110000**		**3200**		**85**		**8.1**		54		**2000**	
SW2-4-15	Waste	WMU		**110000**		15.0	U	15		**2500**		**15.0**		**8.1**		**420**		5.2		**1900**		**250**		**73000**		1800		**170**		3.4		48		**1600**	
SW2-5-15	Waste	WMU		**170000**		14.0	U	10		**3200**		**10.0**		**7.2**		**580**		13.0		**3400**		**330**		**55000**		1800		**270**		5.2		56		**2700**	
SW2-6-20	Waste	WMU		**170000**		13.0	U	12		**800**		**8.2**		2.8		**730**		11.0		**3800**		**190**		**90000**		**6500**		**540**		**12.0**		73		**4400**	
SW2-7-5	Waste	WMU		**150000**		17.0	U	8		**5100**		**17.0**		**8.3**		**320**		3.4	U	**2200**		**330**		**80000**		1700		**130**		5.2		59		**1700**	
SW3-1-10	Waste	WMU		35000		14.0	U	8.8		**12000**		**85.0**		2.9		70		2.9	U	**390**		**120**		**240000**		**11000**		38		**11.0**		18		**1000**	

Table 3-2: Metals Analysis - Solid Matrix

Prefix	Matrix	Area	Bkgd	Aluminum		Antimony		Arsenic		Barium		Beryllium		Cadmium		Chromium		Cobalt		Copper		Lead		Magnesium		Manganese		Nickel		Silver		Vanadium		Zinc	
			PRGr	76,000		31		2.2		5,400		150		37		210		900		3,100		150		-		1,800		1,600		390		550		23,000	
			TTLC	-		15		500		10,000		75		100		2,500		8,000		2,500		1,000		-		-		2,000		100		2400		5,000	
			SQuiRT	-		-		7.2		-		-		0.676		52.3		-		18.7		30.24		-		-		15.9		7.3		-		124	
				Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
SW3-2-20	Waste	WMU		**210000**		12.0	U	7.8		**970**		**7.3**		3.6		**330**		34.0		**2300**		**190**		37000		1800		**190**		3.1		80		**1500**	
SW3-3-10	Waste	WMU		**57000**		17.0	U	1.7	U	**4600**		**170.0**		**4.3**		**99**		3.3	U	**850**		90		**190000**		**12000**		40		5.3		18		**1200**	
SW3-4-5	Waste	WMU		**74000**		17.0	U	7.6		**12000**		**54.0**		**4.9**		**130**		3.4	U	**840**		**160**		**140000**		**4100**		47		**8.0**		34		**940**	
SW3-5-20	Waste	WMU		**79000**		20.0	U	12.0		**13000**		**72.0**		3.2		**140**		4.1	U	**670**		**140**		**130000**		**4100**		37		5.2		40		**1000**	
SW3-6-10	Waste	WMU		44000		21.0	U	2.1	U	**14000**		**150.0**		**5.2**		70		4.2	U	**550**		83		**210000**		**5900**		31		3.8		12		690	
SW3-7-20	Waste	WMU		**83000**		21.0	U	16.0		**15000**		**36.0**		3.5		**130**		4.2	U	**620**		**120**		**150000**		**4600**		34		**7.7**		39		**810**	
SW4-1-5	Waste	WMU		**280000**		13.0	U	5.0		380		**9.3**		**4.3**		**540**		7.0		**6500**		**230**		33000		1600		**460**		3.4		67		**4000**	
SW4-2-5	Waste	WMU		**290000**		13.0	U	4.8		490		**18.0**		**7.4**		**760**		12.0		**8700**		**480**		25000		1800		**570**		**6.8**		79		**4900**	
SW4-3-5	Waste	WMU		**79000**		20.0	U	2.5		**19000**		**95.0**		**5.3**		**110**		4.1	U	**2600**		81		**190000**		**5000**		**87**		4.3		31		**1200**	
SW4-4-10	Waste	WMU		**68000**		20.0	U	2.0		**11000**		**76.0**		2.8		**140**		4.1	U	**1000**		80		**190000**		**5600**		61		5.7		25		**1100**	
SW4-5-20	Waste	WMU		**85000**		21.0	U	**19.0**		**2400**		**14.0**		4.1		**170**		4.2	U	**1700**		**230**		**170000**		1900		74		**7.9**		29		**2000**	
SW4-6-20	Waste	WMU		**120000**		20.0	U	**20.0**		**7700**		**38.0**		**6.7**		**180**		3.9	U	**1300**		**200**		**98000**		**3400**		57		**11**		56		**1400**	
SW4-7-15	Waste	WMU		**120000**		16.0	U	7.8		**6600**		**50.0**		**6.2**		**200**		3.1	U	**1800**		**200**		**110000**		**4000**		**95**		**6.6**		53		**1700**	
SW5-1-5	Waste	WMU		**200000**		18.0		4.0		530		**7.7**		**15.0**		**640**		7.5		**12000**		**1100**		33000		**2700**		**390**		**28.0**		84		**6800**	
SW5-2-15	Waste	WMU		**160000**		17.0	U	12.0		**1400**		**31.0**		**5.1**		**190**		3.4	U	**1300**		**130**		**86000**		**2000**		70		2.6		70		**1200**	
SW5-3-20	Waste	WMU		**140000**		20.0	U	8.8		**2100**		**9.0**		**4.2**		**340**		6.0		**2100**		**350**		**54000**		1500		**130**		2.4		58		**1700**	
SW5-4-15	Waste	WMU		**130000**		18.0	U	14.0		**4500**		**28.0**		**5.4**		**210**		3.5	U	**1200**		**170**		**110000**		**2100**		65		3.1		56		**1400**	
SW5-5-5	Waste	WMU		35000		20.0	U	2.0	U	**18000**		**96.0**		2.9		44		4.1	U	**350**		39		**230000**		**5500**		18		4.4		12		**760**	
SW5-6-5	Waste	WMU		**51000**		21.0	U	2.1	U	**16000**		**92.0**		**5.6**		83		4.3	U	**730**		86		**200000**		**5400**		31		4.3		19		**940**	
SW5-7-10	Waste	WMU		**130000**		23.0	U	6.7		**3500**		**24.0**		**6.6**		**300**		4.7	U	**2000**		**390**		**78000**		1000		**88**		2.8		63		**1300**	

Table Notes:

Laboratory Metals Data by EPA Method 6010 or CLP Method CLPAS ILM05.2.

Data are reported in miligrams per kilogram.

Solid matricies include:

SED - sediments from wetlands, beach, marine, and surface water environments.

SOIL - soils from adjacent, agricultural, residential, and site areas.

WASTE - from source areas at the site.

Bkgd - background

Bkav = mean of background results

Bkhi = Highest background result for this analyte.

3xBkgd = Three times the highest background value for analyte.

J = Analyte detected, result is approximate.

U = Analyte not detected; reported value is the method

J- = Result is estimated; low biased.

Action Levels:

PRGr = Preliminary Remediation Goal - residential: Region IX guidance level for residential soils

TTLC = Total Threshold Limit Concentration - State of California Title 22 Hazardous Waste Regulatory Threshold

SQuiRT = NOOA Threshold Effect Level marine sediment Screening Quick Reference Table guidance value.

Sample names: include a prefix (i.e. "SDB" or "SW4"), a location number, and a depth for subsurface samples.

Prefixes:

SDB = beach sediments

SDM = marine sediments

SWL = wetland sediments

SDF = surface water sediments

SSA = agricultural soils

SSR = residential soils

SSN = soils not otherwise specified

SW F = smelter area waste

SW followed by a number = waste managment unit; the number indicates the area of the WMU

Table 3-3 Radionuclide Data Solid Matrix (data in pCi/g)

Sample ID	Bkgd	^{137}Cs Result	Q	^{40}K Result	Q	^{228}Th Result	Q	^{230}Th Result	Q	^{232}Th Result	Q
Background Soils											
SSN94	Bkgd	0.055		16.2		1.070		0.949		0.913	
SSN95	Bkgd	0.073		27.1		1.160		0.962		1.430	
SSN96	Bkgd	0.048	U	23.0		1.440		1.320		1.560	
SSN97	Bkgd	0.057	U	22.2		1.340		0.856		1.300	
SSN98	Bkgd	0.098	U	25.4		1.240		0.864		1.230	
SSN99	Bkgd	0.057	U	21.8		0.912		0.642		0.794	
mean		0.065		22.6		1.194		0.932		1.205	
standard deviation		0.018		3.7		0.190		0.222		0.297	
confidence		0.015		3.0		0.155		0.181		0.242	
UCI (2nd StDev)		**0.080**		**25.7**		**1.348**		**1.113**		**1.446**	
Residential Soils											
SSR6		0.041	U	21.7		0.614		0.739		0.685	
SSR8		0.055	U	24.0		0.633		0.700		0.618	
Agricultural Soils											
SSA7		0.083	U	**26.3**		1.100		**1.170**		0.687	
SSA8		0.060	U	**26.6**		0.833		0.889		1.120	
Adjacent Soils											
SSN54		0.085	U	9.9		**6.330**		**3.250**		**4.730**	
SSN55		**0.113**		23.3		1.130		1.100		0.855	
SSN58		0.203	U	**76.7**		**6.730**		**6.170**		**5.440**	
SSN60		**0.084**		19.3		**1.590**		0.991		1.140	
SSN62		0.074	U	**27.5**		1.340		0.612		0.737	
SSN74		0.059	U	16.0		1.130	U	0.659		0.937	
SSN75		0.095	U	21.4		**4.120**		**5.900**		**4.600**	
SSN86		0.084	U	**33.8**		**2.690**		**4.570**		**2.120**	
Smelter Soils											
SSN1-1		0.031	U	13.1		**2.290**		**2.150**		**3.140**	
SSN2-8		0.057	U	22.6		0.905		0.661		0.644	
SSN15		0.139	U	10.7		**11.900**		**23.700**		**12.300**	
SSN10-1		**0.249**		23.6		0.555		0.371		0.596	
SSN33-8		0.063	U	17.4		**2.660**		**2.350**		**3.200**	
SSN5-8		0.034	U	16.9		0.479		0.544		0.520	
Waste Disposal Area											
SSN35		0.112	U	6.3		**1.660**		**3.160**		**1.520**	
SSN40		0.034	U	9.0		0.925		0.550		0.710	
SSN49		0.073	U	4.2		0.358		0.244		0.258	
SSN51		0.085	U	5.8		**19.100**		**8.740**		**19.800**	
WMU											
SW1-1-20		0.044	U	6.5		0.665	U	0.383		0.370	U
SW1-2-15		0.033	U	13.6		0.973	U	0.562	U	0.472	U
SW1-4-10		0.031	U	4.4		0.881	U	0.599	U	0.706	U
SW1-4-5		0.078	U	4.8		0.595		0.434		0.641	
SW1-5-5		0.054	U	5.5		0.665	U	0.674	U	0.476	U
SW1-6-20		0.048	U	5.4		0.443	U	0.470	U	0.387	U
SW1-7-15		0.092	U	13.2		1.289	U	0.844	U	0.588	
SW2-1-20		0.052	U	28.2		1.000		**1.170**		0.831	
SW2-3-15		0.053	U	5.5		**1.950**		**3.110**		**1.660**	

Sample ID	Bkgd	^{137}Cs Result	Q	^{40}K Result	Q	^{228}Th Result	Q	^{230}Th Result	Q	^{232}Th Result	Q
WMU (continued)											
SW2-4-15		0.094	U	16.4		0.726	U	1.090		0.627	
SW2-5-15		0.125	U	55.0		0.626		0.569	U	0.569	U
SW2-6-20		0.030	U	4.0		1.130		0.585	U	0.836	
SW2-7-5		**0.079**		10.1		0.625	U	0.307	U	0.412	
SW3-1-10		0.093	U	2.7		0.484	U	**1.380**		0.495	
SW3-2-20		0.052	U	6.5		**1.420**	U	0.888	U	0.620	U
SW3-3-10		0.071	U	7.8		0.337	U	0.857		0.184	
SW3-4-5		0.055	U	6.2		0.690		0.483		0.460	
SW3-5-20		0.097	U	7.4		0.947	U	0.563	U	0.563	U
SW3-6-10		0.049	U	7.1		0.509	U	0.478		0.116	
SW3-7-20		0.039	U	7.1		0.476	U	0.330		0.452	
SW4-1-5		0.036	U	1.9		0.982	U	0.299	U	0.299	U
SW4-3-5		0.066	U	7.3		0.435	U	0.308	U	0.223	U
SW4-4-10		0.054	U	9.0		0.457	U	0.274		0.273	U
SW4-5-20		0.063	U	7.2		**4.480**		**5.250**		**4.790**	
SW4-6-20		0.051	U	5.2		0.767		0.670		0.474	U
SW4-7-15		0.068	U	2.1		0.667	U	0.929		0.465	
SW5-1-5		0.025	U	19.2		0.533	U	0.435	U	0.298	U
SW5-2-15		0.034	U	5.8		0.572	U	0.592	U	0.430	U
SW5-3-20		0.036	U	7.2		0.635	U	0.361	U	0.289	U
SW5-4-15		0.079	U	5.0		0.605	U	0.410		0.301	
SW5-5-5		0.051	U	2.5		0.526	U	0.320	U	0.202	U
SW5-6-5		0.066	U	4.1		0.651	U	0.322	U	0.233	U
SW5-7-10		0.094	U	3.4		0.647	U	0.453	U	0.150	
Smelter Waste											
SWF1		0.078	U	22.3		0.350	U	0.473		0.181	U
SWF5		0.058	U	15.8		0.685	U	0.373	U	0.118	U
OID Sediments											
SDF11	Bkgd	0.063	U	21.4		0.502	U	0.410	U	0.280	U
SDF12	Bkgd	0.034	U	28.5		0.383	U	0.397	U	0.288	U
SDF13	Bkgd	0.055	U	21.7		0.386	U	0.586		0.337	
SDF14	Bkgd	0.040	U	23.7		1.470		0.389		1.750	
SDF15	Bkgd	0.065	U	51.9		0.885		0.892		0.993	
SDF16	Bkgd	0.036	U	25.0		0.814		0.978		0.813	
mean		0.049		28.7		0.740		0.609		0.744	
standard deviation		0.014		11.7		0.417		0.264		0.578	
confidence		0.011		9.5		0.340		0.215		0.470	
UCI (2nd StDev)		**0.060**		**38.2**		**1.080**		**0.824**		**1.214**	
SDF1		0.057	U	19.1		1.020		**0.887**		0.679	
SDF2		0.055	U	26.3		**1.310**		**1.330**		1.080	
SDF3		0.066	U	23.5		0.633		0.646		0.409	
SDF4		0.040	U	19.7		**1.330**		0.791		0.935	
SDF5		0.039	U	21.7		0.117		0.194		0.228	
SDF6		0.110	U	21.7		**2.040**		**1.770**		**1.780**	
SDF7		0.046	U	18.0		1.060		0.661		1.090	
SDF8		0.120	U	22.9		**1.280**		**1.260**		**1.520**	
SDF9		0.058	U	23.5		**1.610**		**2.420**		**1.600**	
SDF10		0.045	U	23.1		**1.560**		**2.430**		**1.580**	

Sample ID	Bkgd	^{137}Cs Result	Q	^{40}K Result	Q	^{228}Th Result	Q	^{230}Th Result	Q	^{232}Th Result	Q
Beach Sediments											
SDB31	Bkgd	0.042	U	20.0		0.399	U	0.466	U	0.446	U
SDB32	Bkgd	0.030	U	17.9		0.320	U	0.199	U	0.496	
SDB33	Bkgd	0.044	U	19.5		0.418	U	0.296		0.329	
SDB34	Bkgd	0.042	U	17.2		1.010	U	0.368	U	0.280	U
SDB35	Bkgd	0.043	U	17.6		0.529	U	0.326		0.400	
SDB36	Bkgd	0.043	U	21.2		0.765	U	0.559	U	0.453	U
mean		0.041		18.9		0.574		0.369		0.401	
standard deviation		0.005		1.6		0.264		0.128		0.082	
confidence		0.004		1.3		0.215		0.104		0.067	
UCI (2nd StDev)		**0.045**		**20.2**		**0.788**		**0.473**		**0.467**	
SDB17		0.060	U	10.9		**0.930**		0.321	U	**0.819**	
SDB18		0.057	U	10.4		**2.720**		**0.886**		**3.670**	
SDB20		0.074	U	11.5		**1.240**		**0.654**		**1.330**	
SDB23		0.077	U	11.2		**1.280**		0.341		**1.330**	
SDB26		0.075	U	13.7		**1.140**		0.366		**1.010**	
SDB30		**0.092**		15.6		0.643		**0.844**		**0.526**	
Marine Sediments											
SDM1	Bkgd	0.077	U	25.7		0.932		0.747		1.150	
SDM2	Bkgd	0.048	U	29.4		0.291		0.453		0.849	
SDM3	Bkgd	0.061	U	23.8		1.050		0.489		0.674	
SDM4	Bkgd	0.118	U	45.8		2.480		1.702		1.697	
SDM5	Bkgd	0.054	U	23.8		0.786		0.537		0.849	
SDM6	Bkgd	0.064	U	24.3		1.670		0.860		1.440	
mean		0.070		28.8		1.202		0.798		1.110	
standard deviation		0.025		8.6		0.768		0.470		0.395	
confidence		0.020		7.0		0.626		0.383		0.322	
UCI (2nd StDev)		**0.091**		**35.8**		**1.827**		**1.181**		**1.432**	
SDM14		0.041	U	24.7		1.140		0.444		1.150	
SDM16		0.065	U	22.5		**1.870**		0.751		**1.710**	
SDM21		0.047	U	25.1		0.382		0.550		0.296	
SDM23		0.049	U	25.2		0.396		0.577		0.410	
SDM24		0.058	U	23.4		0.796		0.777		0.907	
SDM26		0.061	U	23.4		0.626		0.498		0.454	
Wetlands Sediments											
SWL31	Bkgd	0.050	U	21.2		1.260		1.840		1.170	
SWL32	Bkgd	0.073	U	45.4		0.836		0.765		0.975	
SWL33	Bkgd	0.026	U	21.5		0.391	U	0.339	U	0.396	
SWL34	Bkgd	0.063		20.6		0.785		0.552		0.461	
SWL35	Bkgd	0.031	U	21.5		0.341		0.404		0.465	U
SWL36	Bkgd	0.064		22.3		0.563		0.509		0.534	
mean		0.051		25.4		0.696		0.735		0.667	
standard deviation		0.019		9.8		0.341		0.561		0.323	
confidence		0.016		8.0		0.278		0.457		0.263	
UCI (2nd StDev)		**0.067**		**33.4**		**0.974**		**1.192**		**0.930**	
SWL3		0.125	U	25.6		**1.360**		0.437		**0.949**	
SWL5		0.068	U	**36.8**		**1.080**		0.297	U	0.749	
SWL13		0.043	U	7.2		**1.470**		0.547		0.541	
SWL19		0.088	U	9.7		0.879		**1.380**		0.806	
SWL21		0.047	U	8.9		**2.550**		**1.610**		**2.460**	
SWL22		0.053	U	11.0		1.390	U	0.826	U	0.691	U

Notes:
pCi/g = PicoCuries per gram
Bkgd = background sample
^{137}Cs = Cesium-137 isotope
^{40}K = Potassium-40 isotope
^{228}Th = Thorium-228 isotope
^{230}Th = Thorium-230 isotope
^{232}Th = Thorium-232 isotope
WMU = Waste Management Unit
OID = Oxnard Industrial Drain

U = Analyte not detected; result is the method detection limit.
Q = Data Qualifier
Highlights = Calculations for matrix-specific action level based on the mean, standard deviation, number of samples, and a confidence of 95.4% (see text)
UCI (2nd StDev) = Second standard deviation of the background population.

Boldface = results that exceed 2 standard deviations above the background population for each matrix. All soils and wastes are compared to the background soil values. Sediment samples are compared to background results for each sub matrix.

Table 3-4: Detectable Volatile Organic Compound (VOC) Data Solid Matrix

Sample ID Prefix	Matrix	Area	1,2,4-Trimethylbenzene		1,3,5-Trimethylbenzene		2-Butanone (MEK)		Acetone		Benzene		Butylbenzene		Carbon disulfide		Chloromethane		Isopropylbenzene		m&p-Xylene		Naphthalene		o-Xylene		p-Isopropyltoluene		Propylbenzene		sec-Butylbenzene		Tetrachloroethene		Trichlorofluoromethane	
			Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
SSN4/1	soil	Smelter	NA		NA		11	U	11	U	1.3	U	NA		1.3	U	1.3	U	NA		2.6	U	NA		1.3	U	NA		NA		NA		3.1	J	1.3	U
SSN7/1	soil	Smelter	18	J	7.4	J	23	J	120	J	1.2	U	1.6	J	2.0	J	1.2	U	2.2	J	2.3	U	1.3	J	1.2	U	2.9	J	2.5	J	3.3	J	1.2	U	1.2	U
SSN5/1	soil	Smelter	NA		NA		13	U	17	J	1.6	U	NA		1.6	U	1.6	U	NA		3.5	J	NA		1.8	J	NA		NA		NA		1.6	U	1.6	U
SSN6/1	soil	Smelter	NA		NA		9.8	U	12	J	1.2	U	NA		1.2	U	1.2	U	NA		2.5	U	NA		1.2	U	NA		NA		NA		1.2	U	1.2	U
SW4-3/5	waste	WMU	NA		NA		13	U	430	J	1.6	U	NA		1.6	U	1.6	U	NA		3.2	U	NA		1.6	U	NA		NA		NA		1.6	U	1.6	U
SW5-2/15	waste	WMU	NA		NA		14	U	100	J	1.8	U	NA		5.9	J	1.8	U	NA		3.5	U	NA		1.8	U	NA		NA		NA		1.8	U	1.8	U
SW1-1/10	waste	WMU	NA		NA		17	U	49	J	2.1	U	NA		2.1	U	2.1	U	NA		4.2	U	NA		2.1	U	NA		NA		NA		2.1	U	2.1	U
SW1-2/5	waste	WMU	NA		NA		17	U	25	J	2.1	U	NA		2.1	U	2.1	U	NA		4.2	U	NA		2.1	U	NA		NA		NA		2.1	U	2.1	U
SW2-1/10	waste	WMU	NA		NA		12	U	22	J	1.6	U	NA		1.6	U	1.6	U	NA		3.1	U	NA		1.6	U	NA		NA		NA		1.6	U	10	J
SW2-3/5	waste	WMU	NA		NA		17	U	17	J	2.1	U	NA		2.1	U	2.1	U	NA		4.3	U	NA		2.1	U	NA		NA		NA		2.1	U	2.1	U
SW3-2/15	waste	WMU	NA		NA		24	U	110	J	3.0	U	NA		5.1	J	3.0	U	NA		6.0	U	NA		3	U	NA		NA		NA		3.0	U	3	U
SW3-3/5	waste	WMU	NA		NA		42	J	690	J	3.5	U	NA		3.5	U	3.5	U	NA		6.9	U	NA		3.5	U	NA		NA		NA		3.5	U	3.5	U
SW4-6/10	waste	WMU	NA		NA		16	U	22	J	1.9	U	NA		1.9	U	1.9	U	NA		3.9	U	NA		1.9	U	NA		NA		NA		1.9	U	1.9	U
SW5-7/5	waste	WMU	NA		NA		23	U	26	J	2.9	U	NA		2.9	U	2.9	U	NA		5.8	U	NA		2.9	U	NA		NA		NA		2.9	U	2.9	U
PRGr			52,000		21,000		7,300,000		1,600,000		600		240,000		360,000		3,000		-		270,000		56,000		270,000		-		240,000		220,000		1,500		390,000	

Notes: All data are in micrograms per kilogram.

U = Analyte not detected; result is the method detection limit.

Q = Data Qualifier

J = Analyte detected, result is approximate.

NA - Not Analyzed

PRGr = Residential Preliminary Remediation Goal for soil.

Table 3-5: Metals Data - Water Matrix (in ug/L)

Sample ID	Aluminum	Q	Antinomy	Q	Arsenic	Q	Barium	Q	Beryllium	Q	Cadmium	Q	Chromium	Q	Cobalt	Q	Copper	Q	Iron	Q	Lead	Q	Magnesium	Q	Manganese	Q	Nickel	Q	Silver	Q	Vanadium	Q	Zinc	Q
	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
Surface Water Samples																																		
WS7	20	J	60	U	4.7	J	42.3	J	0.09	J	5	U	10	U	50	U	5.7	J	84.9	J	10	U	215000		110		3.6	J	10	U	0.82	J	5.1	J
WS8	22.8	J	6.2	J	10	U	37.1	J	0.08	J	5	U	10	U	50	U	5.5	J	102		10	U	167000		109		4.5	J	10	U	0.63	J	8	J
WS9	47	J	60	U	8	J	33.6	J	0.08	J	5	U	10	U	50	U	5.3	J	192		10	U	141000		118		3.9	J	10	U	1.1	J	13.1	J
WS10	19.3	J	60	U	5.9	J	34.3	J	0.06	J	5	U	10	U	50	U	5.2	J	141		10	U	140000		154		4.2	J	10	U	1.6	J	11.8	J
3x Bkgd	**141**		-		**30**		**126.9**		**0.27**		-		-		-		**17.1**		**576**		-		**645000**		**462**		**13.5**		-		**4.8**		**39.3**	
WS1	**417**		60	U	5.1	J	41.9	J	0.21	J	5	U	10	U	50	U	19.4	J	305		10	U	148000		148		4.9	J	10	U	1.8	J	47.5	J
WS2	148	J	60	U	5.5	J	142	J	5	U	0.36	J	10	U	50	U	**45.3**		147		10	U	343000		297		3	J	10	U	50	U	32.1	J
WS3	**425**		60	U	10	U	153	J	0.21	J	0.41	J	10	U	50	U	**67.1**		175		10	U	314000		**1100**		3.5	J	10	U	50	U	44	J
WS4	61.4	J	60	U	10	U	36.5	J	0.07	J	5	U	10	U	50	U	5.5	J	127		10	U	153000		128		3.9	J	10	U	0.83	J	12.6	J
WS5	46.2	J	60	U	10	U	33.3	J	0.1	J	5	U	10	U	50	U	5.3	J	129		10	U	133000		131		4.4	J	10	U	1.2	J	12.3	J
WS6	**534**		60	U	6.9	J	59.4	J	0.25	J	5	U	10	U	50	U	15.9	J	355		10	U	160000		98.8		5.2	J	10	U	1.5	J	33.8	J
Groundwater Samples																																		
MCL			**6**		**10**		**2000**		**4**		**5**		**100**				**1300**				**15**													
MW-5	1440		60	U	10	U	105	J	0.15	J	0.92	J	13.5		50	U	43.4		945		10	U	385000		237		6	J	10	U	3.3	J	45.7	J
3xbkgd	**4320**		-		-		**315**		**0.45**		**2.76**		**40.5**		-		**130.2**		**2835**		-		**1155000**		**711**		**18**		-		**9.9**		**137.1**	
MW-1	2380		60	U	10	U	**417**		0.2	J	5	U	3.1	J	50	U	9.3	J	**4430**		10	U	191000		567		13.4	J	10	U	6.6	J	40.8	J
MW-2	1240		9.2	J	6.5	J	**665**		0.07	J	0.92	J	10	U	1.6	J	73.4		1080		10	U	1470000		**4500**		8.1	J	10	U	3.3	J	63.5	
MW-4	**6200**		60	U	10	U	126	J	0.47	J	5	U	0.73	J	1.2	J	15.8	J	**4560**		10	U	298000		400		9	J	10	U	9.3	J	29.3	J
MW-6	1710		60	U	6.5	J	**5400**		0.15	J	0.59	J	0.73	J	2.5	J	19.1	J	1560		10	U	186000		**728**		3.5	J	10	U	2.8	J	51.4	J
MW-11	1010		60	U	7.3	J	110	J	0.15	J	5	U	10	U	1.9	J	59.3		**26800**		**61.8**		425000		**1250**		15	J	10	U	1.8	J	**318**	
MW-12	1200		60	U	7.1	J	**1570000**		0.16	J	**10.3**		10	U	**281**		**147**		692		10	U	**2700000**		**1150**		6.7	J	8.4	J	2.6	J	95.2	
MW-13	671		60	U	10	U	147	J	5	U	5	U	10	U	50	U	19.2	J	**4310**		**35.9**		296000		465		5.4	J	10	U	1.3	J	70.1	
MW-14	**9240**		60	U	4.5	J	249		0.57	J	5	U	13.7		4	J	82.3		16200		**18.8**		179000		**1390**		15.3	J	10	U	25.8	J	245	
MW-15	2660		60	U	10	U	141	J	0.17	J	5	U	3.7	J	1.2	J	3.6	J	**8130**		10	U	100000		**805**		3.9	J	10	U	7.8	J	29.9	J
MW-16	41800	J-	60	U	40.8	J-	570	J-	1.7	J	0.95	J	41.2	J-	11.1	J-	148	J-	70500	J-	10	U	524000	J-	6610	J-	31.7	J-	10	U	92.2	J-	200	J-
MW-17	12500	J	18.7	J	10	U	896	J	22.7	J	398	J	159	J	63.6	J	8630	J	117000	J	4350	J	11100000	J	328000	J	107	J	56	J	50	U	90100	J
MW-18	2920000	J-	60	U	264	J-	5030	J-	355	J-	135	J-	3810	J-	307	J-	77700	J-	1040000	J-	2790	J-	4110000	J-	98600	J-	1610	J-	571	J-	1490	J-	51500	J-
MW-19	1190		60	U	5.5	J	**2020**		0.12	J	5	U	10	U	50	U	8.8	J	1050		10	U	718000		**2510**		40	U	10	U	2.1	J	15.7	J

Notes:

Laboratory Metals Data by EPA Method 6010 or CLP Method CLPAS ILM05.2.

ug/L = micrograms per liter.

Q = Data qualifier

J = Analyte detected, result is approximate.

U = Analyte not detected; reported value is the method detection limit

Bkgd - background; samples and calculations are in yellow highlight.

3xBkgd = Three times the highest background value for analyte.

ND = analyte was not detected in background; any detect in downgradient sample is considered significant.

J- = Result is estimated, biased low due to sample preservation

Boldface = Results exceed 3x background; approximated (J-flagged results are not boldfaced, even when low-biased results exceed 3x background.

Table 3-6 Radionuclide Data - Water Matrix (in pCi/L)

		^{137}Cs		^{40}K		^{228}Th		^{230}Th		^{232}Th	
		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Groundwater											
MW5-270606-1750	Bkgd	3.6	U	660		0.557	U	0.433	U	0.443	U
3x Bkgd		**-**		**1980**		**-**		**-**		**-**	
MW11-280606-1647		3.44	U	659		0.344	U	0.246	U	0.268	U
MW12-280606-1550		18.7	U	**19800**		**105**		**0.995**		**0.424**	
MW1-270606-1810		5.9	U	**3560**		0.496	U	0.621	U	0.3171	U
MW13-280606-1738		4.08	U	862		0.329	U	0.291	U	0.236	U
MW14-280606-1500		3.33	U	129		**0.754**		**1.39**		**0.872**	
MW15-280606-1822		5.04	U	52.7	U	**1.41**		**0.988**		**0.48**	
MW16-280606-0925		5.2	U	**5540**		**1.05**		**0.61**		**0.27**	
MW18-290606-0930		4.9	U	**6710**		0.48	U	0.276	U	0.212	U
MW19-280606-1030		4.83	U	**7370**		0.611	U	0.351	U	0.205	U
MW2A-280606-0758		5	U	**7390**		0.695		0.345		0.278	U
MW4-270606-1830		3.98	U	143		**0.686**		**0.806**		**0.694**	
MW6-270606-1735		3.99	U	**6840**		1.34		2.17		0.549	U
Surface Water											
WS7-280606-1540	Bkgd	3.24	U	24.8	U	0.67	U	0.329	U	0.239	U
WS8-280606-1600	Bkgd	2.71	U	45.5		0.697	U	0.195	U	0.279	U
WS9-280606-1615	Bkgd	2.84	U	42.5		1.22	U	0.637	U	0.682	U
WS10-280606-1630	Bkgd	3.3	U	27	U	0.391	U	0.197	U	0.259	U
3x Bkgd		**-**		**136.5**		**-**		**-**		**-**	
WS1-270606-1245		2.81	U	44.8	U	1.372	U	0.902	U	0.608	U
WS2-270606-1440		3.06	U	**264**		0.815	U	0.642	U	0.552	U
WS3-280606-0952		3.12	U	**198**		0.765	U	0.419	U	0.396	U
WS4-280606-0958		3.15	U	81		0.753	U	0.424	U	0.407	U
WS5-280606-1016		3.56	U	51.6	U	0.518	U	0.68	U	0.68	U
WS6-290606-0815		2.99	U	53.9	U	0.761	U	0.408	U	0.313	U

Notes:

pCi/L = PicoCuries per Liter

Bkgd = background sample

^{137}Cs = Cesium-137 isotope

^{40}K = Potassium-40 isotope

^{228}Th = Thorium-228 isotope

^{230}Th = Thorium-230 isotope

^{232}Th = Thorium-232 isotope

WMU = Waste Management Unit

OID = Oxnard Industrial Drain

U = Analyte not detected; result is the method detection limit.

Q = Data Qualifier

Boldface = results that exceed 3 times background where analyte is detected in background. Because of the large number of non-detected analytes in the background samples, the normal 2 standard deviations above the background population for each matrix could not be applied. Results in downgradient samples are, instead compared to 3 times the highest reported background, or detected results where the analyte is not detected in background (denoted by a "-" in the "3x Bkgd" row).

Table 3-7: Detectable Volatile Organic Compounds (VOC) Data - Water Matrix

Sample ID Prefix	Background	Chloromethane		Acetone		Methyl tert-butyl ether (MTBE)		2-Butanone		Benzene	
Surface Water Samples		Results (ug/L)	Q	Results (ug/L)	Q	Results (ug/L)	Q	Results (ug/L)	Q	Results (ug/L)	Q
WS7	bkgd	0.50	U	5.4	J	0.50	U	5.0	U	0.50	U
WS8	bkgd	0.50	U	8.0	J	0.50	U	5.0	U	0.50	U
WS9	bkgd	0.50	U	7.8	J	0.50	U	5.0	U	0.50	U
WS10	bkgd	0.50	U	8.2	J	0.51	J	5.0	U	0.50	U
3x Bkgd		-		24.6		1.53		-		-	
WS1		0.50	U	6.4	J	0.50	U	5.0	U	0.50	U
WS2		0.50	U	5.0	R	0.50	U	5.0	U	0.50	U
WS3		0.50	U	5.0	R	0.50	U	5.0	U	0.50	U
WS4		0.50	U	6.3	J	0.50	U	5.0	U	0.50	U
WS5		0.50	U	5.2	J	0.50	U	5.0	U	0.50	U
WS6		0.50	U	8.7	J	0.50	U	5.0	U	0.50	U
Groundwater Samples											
MW5	bkgd	0.50	U	5.0	R	0.50	U	5.0	U	0.50	U
3x Bkgd		-		-		-		-		-	
MW1		0.50	U	5.0	R	0.50	U	5.0	U	0.50	U
MW2A		0.50	U	18	J	0.50	U	5.0	U	0.50	U
MW4		0.50	U	6.5	J	0.50	U	5.0	U	0.50	U
MW6		**2.8**		9.8	J	0.50	U	5.0	U	0.50	U
MW11		0.50	U	5.4	J	0.50	U	5.0	U	0.50	U
MW12		0.50	U	270	J	0.50	U	5.0	U	**0.74**	
MW13		0.50	U	7.5	J	0.50	U	5.0	U	0.50	U
MW14		0.50	U	8.1	J	0.50	U	5.0	U	0.50	U
MW15		0.50	U	5.0	R	0.50	U	5.0	U	0.50	U
MW16		0.50	U	5.0	R	0.50	U	5.0	U	0.50	U
MW17		0.50	U	800	J	0.50	U	**40**		0.50	U
MW18		0.50	U	160	J	0.50	U	7.0	J	0.50	U
MW19		0.50	U	60	J	0.50	U	**12**		**0.68**	

Notes: ug/L = micrograms per Lite U = Analyte not detected; result is the method J = Analyte detected, result is approximate.
bkgd = background sample Q = Data Qualifier
R = Analyte not detected at quantifiable level; result is the laboratory reporting limit.

Table 3-8: Metals Data - Air Matrix (in ng/ft^3)

station	date	Aluminum Result	Q	Antimony Result	Q	Arsenic Result	Q	Barium Result	Q	Beryllium Result	Q	Cadmium Result	Q	Chromium Result	Q	Cobalt Result	Q	Copper Result	Q	Lead Result	Q	Magnesium Result	Q	Manganese Result	Q	Molybdemum Result	Q	Nickel Result	Q	Selenium Result	Q	silver Result	Q	Thallium Result	Q	Vanadium Result	Q	Zinc Result	Q
AIR-1	200606	1240	U	0.561	U	0.117	U	262	U	0.0693		ND		1.73	U	ND		1.05		0.326	U	117	U	0.964	U	0.173		0.38	U	ND		ND		ND		1.11	U	183	U
AIR-2	200606	1380	U	ND		ND		263	U	0.157		0.0216		2.01	U	0.047	U	**4.82**		0.648	U	**312**		**6.52**		0.104		**0.7**		ND		ND		ND		1.28	U	176	U
AIR-3	200606	1610	U	ND		0.106	U	287	U	0.123		0.036		2.28	U	0.062	U	**6.78**		**1.01**		**374**		**6.91**		0.169		**0.716**		ND		ND		ND		1.33	U	183	U
AIR-4	200606	1400	U	ND		0.116	U	278	U	0.0709		0.0239		1.93	U	0.05	U	0.539		0.327	U	115	U	1.09	U	0.141		0.404	U	ND		ND		ND		1.37	U	189	U
AIR-5	200606	1420	U	ND		ND		306	U	0.0752		ND		1.88	U	ND		0.578		0.295	U	109	U	0.98	U	ND		0.457	U	ND		ND		ND		1.52	U	210	U
AIR-1	210606	828	U	ND		0.0924	U	104	U	0.037		0.0573		1.25	U	0.029	U	2.01		0.453	U	94.2	U	0.714	U	0.0765		0.474		0.0731		ND		ND		0.856	U	80.6	U
AIR-2	210606	1050	U	ND		0.105	U	175	U	0.0765		0.0187		1.47	U	0.031	U	3.8		**0.533**		**200**		**3.17**		0.131		0.424	U	ND		ND		ND		0.945	U	112	U
AIR-3	210606	7280	U	ND		ND		1570	U	**0.393**		**0.122**		10.5	U	ND		**6.37**		2.11	U	503	U	4.58	U	**0.941**		2.29	U	ND		ND		ND		6.06	U	1040	U
AIR-4	210606	984	U	0.389	U	0.107	U	190	U	0.0561		0.0454		1.42	U	0.076	U	0.938		0.419	U	104	U	**1.52**		0.179		0.398	U	ND		**0.071**		ND		0.996	U	129	U
AIR-5	210606	908	U	ND		0.106	U	184	U	0.0485		ND		1.26	U	ND		0.821		0.278	U	75.5	U	0.597	U	0.0963		0.311		ND		ND		ND		0.914	U	128	U
AIR-6	210606	1270	U	0.481	U	0.133	U	247	U	0.148		ND		1.81	U	0.041	U	4.78		**0.714**		**343**		**6.84**		0.121		0.532	U	ND		ND		ND		1.1	U	159	U
AIR-1	220606	797	U	ND		0.0632	U	136	U	0.0443		0.0165		1.15	U	0.033	U	0.665		0.254	U	89.9	U	0.58	U	0.125		0.313	U	ND		ND		ND		0.844	U	97.3	U
AIR-2	220606	1180	U	0.365	U	0.0882	U	183	U	**0.155**		0.0336		1.8	U	0.046	U	**8.59**		**1.06**		**416**		**8.19**		0.119		**0.794**		ND		ND		ND		1.16	U	114	U
AIR-3	220606	847	U	ND		0.0657	U	162	U	0.0925		ND		1.22	U	0.033	U	1.62		0.284	U	134	U	**2.2**		0.0729		0.362	U	ND		ND		ND		0.897	U	108	U
AIR-4	220606	593	U	ND		0.0973	U	108	U	0.0495		ND		0.908	U	0.053	U	0.777		0.383	U	112	U	**2.67**		0.0818		0.364	U	ND		ND		ND		0.816	U	77.4	U
AIR-5	220606	906	U	ND		ND		180	U	0.0507		ND		1.29	U	ND		1.13		0.189	U	79.9	U	0.753	U	0.112		0.337	U	ND		ND		ND		0.972	U	122	U
AIR-6	220606	958	U	ND		ND		171	U	**0.169**		0.0157		1.41	U	0.038	U	**4.91**		**0.682**		**330**		**7.41**		0.11		**0.458**		ND		ND		ND		0.892	U	109	U
AIR-1	230606	1040	U	ND		ND		207	U	0.0579		0.0189		1.52	U	ND		1.23		0.313		89.8	U	0.833	U	0.122		0.398	U	ND		ND		ND		1.02	U	149	U
AIR-6	230606	1330	U	ND		0.115	U	250	U	**0.23**		ND		1.94	U	0.039	U	**3.91**		0.512	U	**360**		**8.72**		0.144		0.536	U	ND		ND		ND		1.26	U	166	U
AIR-1	240606	866	U	ND		ND		154	U	0.0476		ND		1.22	U	ND		1.17		0.201	U	69.9	U	0.61	U	0.11		0.223	U	ND		ND		ND		0.797	U	106	U
AIR-2	240606	1360	U	0.437	U	0.0906	U	293	U	0.115		ND		1.89	U	ND		2.87		0.381	U	186	U	**3.24**		0.163		0.403	U	ND		ND		ND		1.24	U	196	U
AIR-1	260606	2220	U	0.963	U	ND		459	U	0.114		0.0764		3.16	U	0.101	U	2.27		0.563	U	177	U	1.85	U	0.25		0.806	U	ND		0.088		ND		2.14	U	338	U
AIR-2	260606	1710	U	ND		ND		313	U	0.237		0.0246		2.5	U	0.082	U	**8.9**		**0.992**		**519**		**12.7**		0.197		**1.04**		0.154		0.079		ND		2.41	U	194	U
AIR-4	260606	1590	U	1.17	U	0.319	U	323	U	0.0828		0.0291		2.35	U	0.158	U	0.567		0.436	U	121	U	1.39		0.31		0.571	U	0.138		0.189		0.26		1.93	U	217	U
AIR-6	260606	219	U	**0.0904**		**0.0183**		46.4	U	0.0158	U	ND		0.304	U	0.011	U	0.841		0.06	U	28.6	U	0.509	U	0.0315	U	0.083	U	0.0319		ND		0.02		0.23	U	31.3	U
AIR-1	270606	599	U	0.326		0.0847		112	U	0.0458	U	ND		0.915	U	0.037	U	1.61		0.196	U	76.7	U	1.42		0.1	U	0.558		ND		0.026		ND		1.17	U	75.1	U
AIR-2	270606	665	U	0.251		0.0636		126	U	**0.122**		ND		0.997	U	0.041	U	4.09		0.336	U	**160**		**3.9**		0.0666	U	0.951	U	**0.0769**		0.03		ND		1.16	U	79.9	U
AIR-3	270606	614	U	0.197		0.0805		104	U	0.0726	U	**0.0135**		0.938	U	0.038	U	4.19		0.307	U	121	U	**2.79**		0.0805	U	**1.03**		ND		0.031		0.06		1.14	U	71.2	U
AIR-4	270606	1320	U	ND		0.115		218	U	0.0715	U	ND		2	U	0.076	U	4.28		0.446	U	108	U	2.19	U	0.16	U	0.941	U	ND		0.074		ND		1.58	U	152	U
AIR-6	270606	865	U	0.274		0.0457		150	U	**0.375**		**0.0114**		1.35	U	0.054	U	**6.89**		**0.642**		440		**13.3**		0.105	U	0.982	U	ND		0.057		ND		1.35	U	92.9	U
AIR-1	280606	516	U	0.219		ND		107	U	0.0285	U	ND		0.914	U	0.034	U	0.663	U	0.151	U	56.7	U	0.591	U	0.0542		0.424		ND		0.024		ND		1	U	71.2	U
AIR-2	280606	667	U	0.221		**0.056**		106	U	0.104	U	ND		1.02	U	0.039	U	**3.04**		0.341	U	**197**		**5**		0.082	U	0.708	U	ND		0.034		ND		1	U	70.7	U
AIR-3	280606	790	U	ND		ND		123	U	0.0941	U	**0.0126**		1.2	U	0.024	U	**7.2**		**0.824**		**317**		**6.77**		ND		**1.34**		ND		ND		ND		1.26	U	71.1	U
AIR-4	280606	897	U	0.478		**0.0986**		167	U	0.0471	U	ND		1.28	U	0.04	U	0.286	U	0.176	U	60.9	U	0.644	U	0.134	U	0.261	U	ND		0.038		ND		0.979	U	112	U
AIR-6	280606	517	U	0.265		**0.0661**		81.3	U	0.112	U	ND		0.833	U	0.038	U	**2.53**		0.256	U	**182**		**5.43**		0.069	U	0.797	U	**0.0458**		0.037		ND		0.746	U	53.6	U

Notes: Metals in 4" air matrix samples by EPA Method 6010B.

Data have been validated; MDLs have been adjusted to 5x blank filter samples.

Data have been converted from micrograms per filter to nanograms per cubic foot, based on average air flow and time of sampling.

ng/ft3 = nanograms per cubic foot.

MDL = Method Detection Limit

ND = analyte not detected above laboratory method detection limit.

Q = Data Validation Qualifier - "U" = analyte detected, but revised to "not detected above mdl" due to high blank concentrations.

Boldface = Results in **boldface** are downgradient air sample results that significantly exceed the background (highlighted) results for that sampling day.

Table 3-9: Arsenic in Fish Tissue

Sample	Arsenic
Fish-1	0.51 ppm
Fish-2	0.51 ppm
Fish-3	0.31 ppm
Fish-4	0.31 ppm
Fish-5	0.21 ppm
Fish-6	0.40 ppm
Fish-7	0.38 ppm
Fish-9	0.19 ppm
Fish-10	0.43 ppm

Figure 2-1: Site Location and Site Areas Map

Halaco Engineering Company
Integrated Assessment Draft Report

January 2007

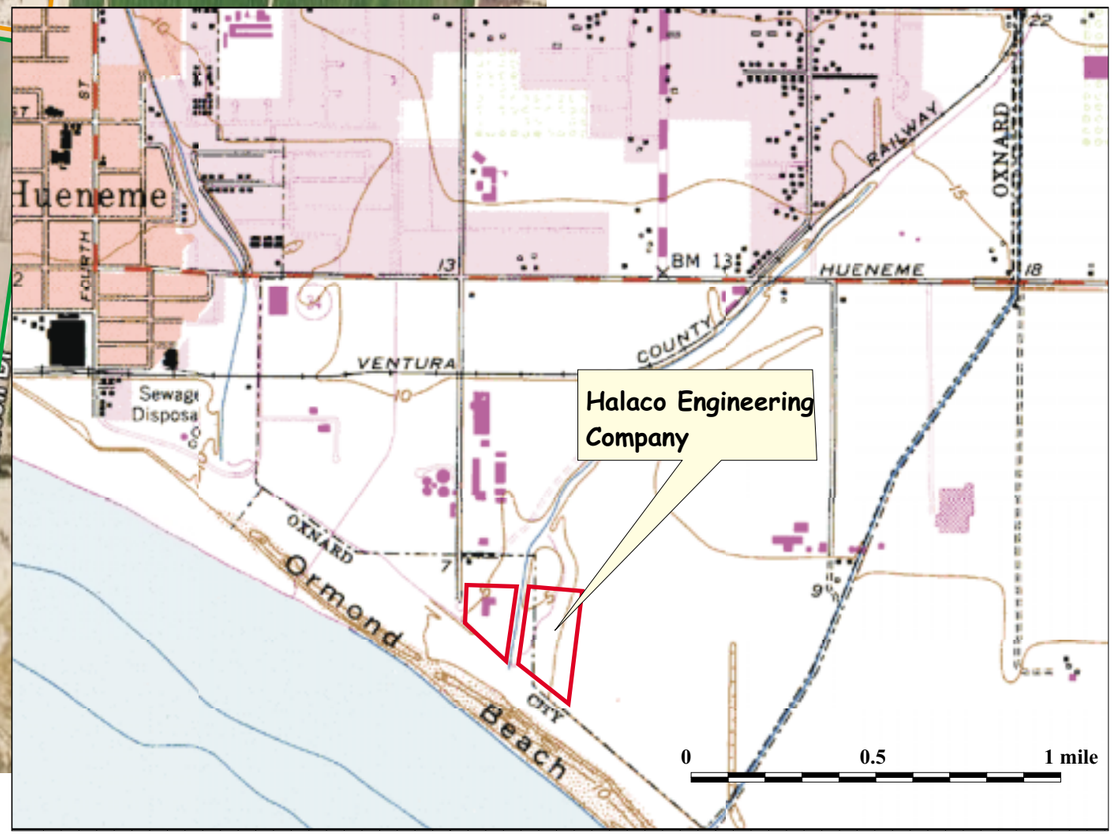

Figure 3-1: Solid Matrix Sample Location Map

Halaco Engineering Company
Integrated Assessment Draft Report

January 2007

- Surface Sediment Sample (SDF).
- Residential(SR) and Agricultural (SA) Samples.
- Soil Sample (SSN)
- Soil Boring Location (SSN)
- Wetlands Sediment Sample (SWL)
- Beach Sediment Sample (SDB)
- Marine Sediment Sample (SDM)

N

Scale in Miles

0 0.1 0.2 0.3 0.4 0.5

Prepared by WestonSolutions, Inc.
14724 Ventura Blvd. #1000
Sherman Oaks, CA 91403
(818) 382-1800 voice
(818) 382-1801 fax

Figure 3-2: Solid Matrix Sample Locations Near Site Halaco Engineering Company Integrated Assessment Draft Report

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Surface Sediment Sample (SDF).

Residential(SR) and Agricultural (SA) Samples.

Soil Sample (SSN)

Soil Boring Location (SSN)

Wetlands Sediment Sample (SWL)

Beach Sediment Sample (SDB)

Marine Sediment Sample (SDM)

Waste Samples from Smelter Area

Scale in feet

0 100 200 300 400 500

Prepared by WestonSolutions, Inc.
14724 Ventura Blvd. #1000
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(818) 382-1800 voice
(818) 382-1801 fax

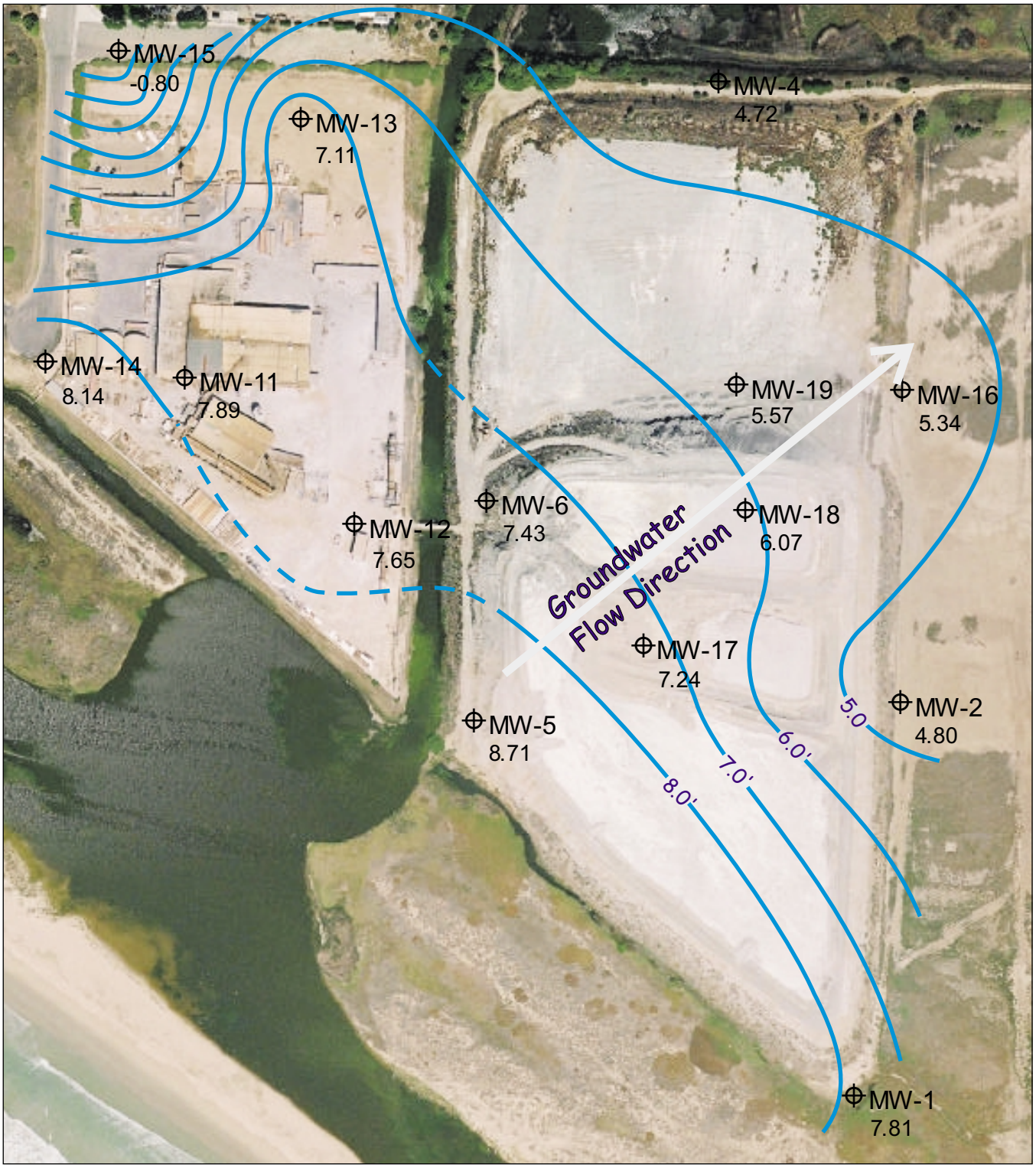

Figure 3-3: Groundwater Monitoring Wells and Groundwater Gradient
Halaco Engineering, Inc. IA
Oxnard, Ventura Co. CA

Figure 3-4: Surface Water Pathway
Halaco Engineering, Inc. IA
Oxnard, Ventura Co. CA

Map showing downgradient sample locations where metals data exceed three-times background.

0 500 1000

Scale in Feet

N

AIR1 Air Sampling Station

prevalent wind directions

WESTON SOLUTIONS

Figure 3-5:Air Sampling Stations
Halaco Engineering, Inc. IA
Oxnard, Ventura Co. CA

Map showing locations of air sampling stations around the WMU.

Appendix A:
Transmittal List

Appendix B:
Site Reconnaissance Interview
and
Observation Report/
Photo Documentation

Appendix C:
Contact Log
and
Contact Reports

Appendix D:
Latitude and Longitude Calculations Worksheet

Appendix E:
References

Appendix F:
EPA Quick Reference
Fact Sheet

Appendix G: Sampling and Analysis Plan

Appendix H:
Analytical Results

Appendix I:
Enhanced Radiation Ground Survey Maps

Appendix J:
Halaco IA Technical Addendum